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July 2, 1956

Electrical World

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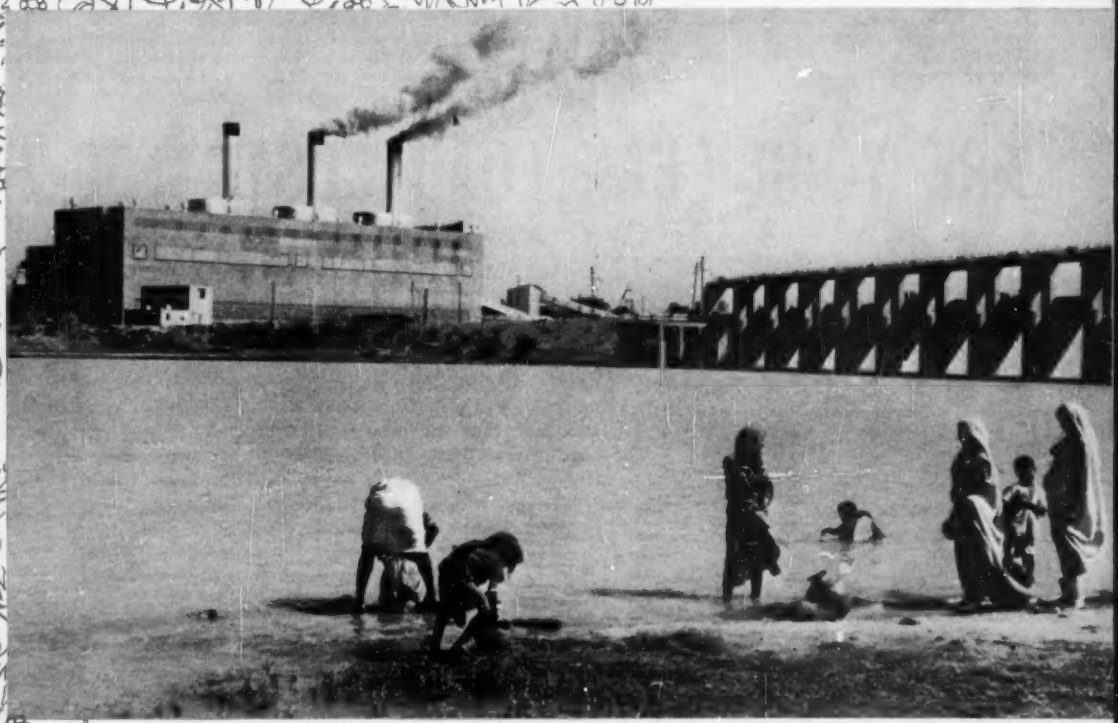
Will Power Mean Prosperity for India? . . . page 16



Typing Orders 600 Strokes a Minute . . . page 47

E B POWER GS W L
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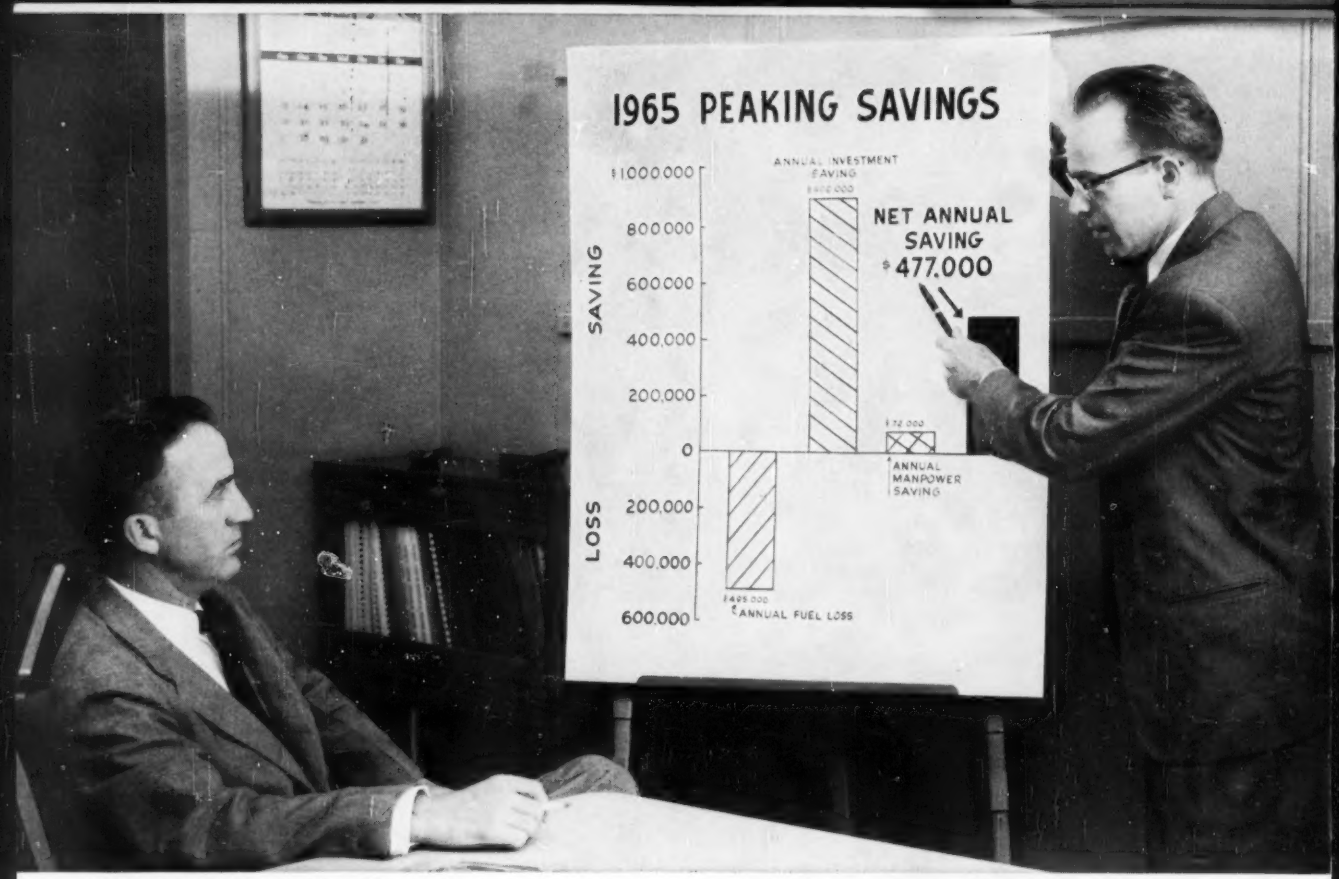

RECENT PEAK LOAD STUDY RESULTS are pointed out by W. D. Marsh, Power Generation Engineer, to J. R. Casey, Manager—Marketing of G.E.'s Gas Turbine Department. Study covered a typical 1,000,000-kw utility system having average load characteristics and steam station fuel cost of 30 cents per million BTU. Gas Turbine stations contained three 25,000-kw units burning 70 cents per million BTU distillate oil. Although fuel cost was higher using gas turbines, savings in investment and manpower more than offset this, giving by 1965 a net savings of $477,000 per year.

ARE YOUR PEAK LOAD COSTS TOO HIGH?

INCREASES IN GAS TURBINE RATINGS, noted here by C. M. Wright (left), Gas Turbine Manager—Electric Utility Sales, and W. J. McLachlan, Manager—Engineering Planning & Development, offer electric utilities greater incentive for their use in peak load applications. 21,800-kw unit model is shown.

New study shows that gas turbines may be the most economical answer on many systems

The long-sought solution to the electric utility problem of how to serve short-term peak loads most efficiently may well be crystallizing, according to a recent General Electric study. Preliminary investigations show promise of reducing gas turbine generation station first costs to $100 per kw or less.

As the rate of peak load growth continues to quicken on many systems, a review of present practices in the light of these data indicates that it may be well to plan for future peak loads by installing low-cost gas turbines as a portion of new generating capacity.

In addition to low first cost, the inherent simplicity and compactness of gas turbines reduces operating labor costs from 25 to 50%. And, the gas turbine is easily adapted for unattended operation which can still further reduce operating costs. Fast start-up, low maintenance, and the absence of standby losses also contribute to operating economy and provide ideal flexibility for peak load service.

For further information contact your local G-E Apparatus Sales Representative. A copy of the new study, "Gas Turbines for Peak Load Generation on Large Utility Systems," can be obtained by writing to General Electric Co., GER-1197, Schenectady 5, N. Y.

301-324

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ELECTRICAL WORLD

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Electrical World

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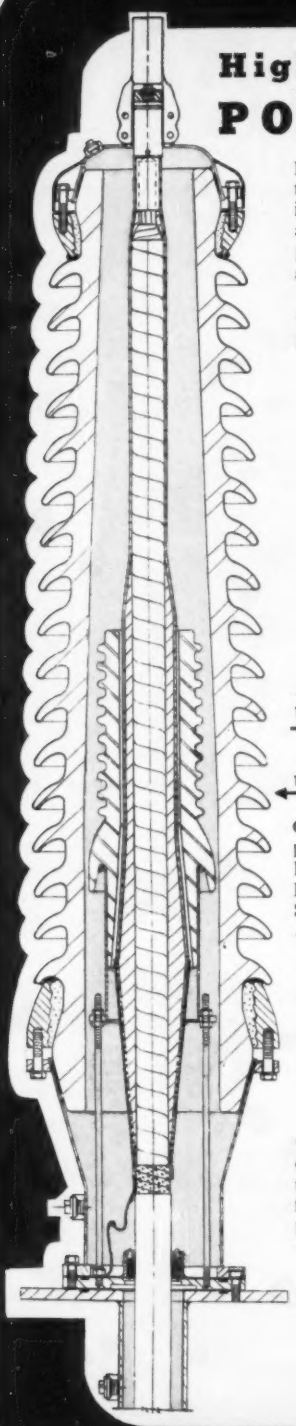
• • •

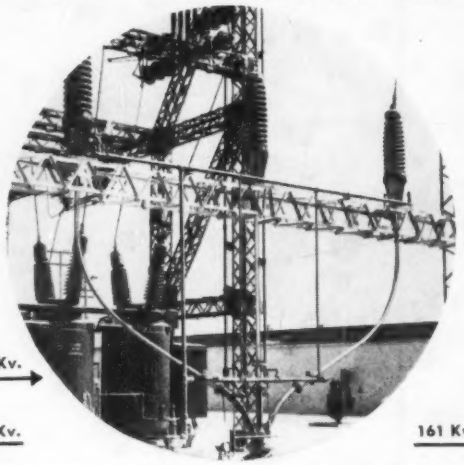
COMING NEXT WEEK—Some years ago extra high voltage was one of the industry's unexplored areas. Today more and more companies are turning to it as a solution to their transmission problems. Next week EW will report their experiences.

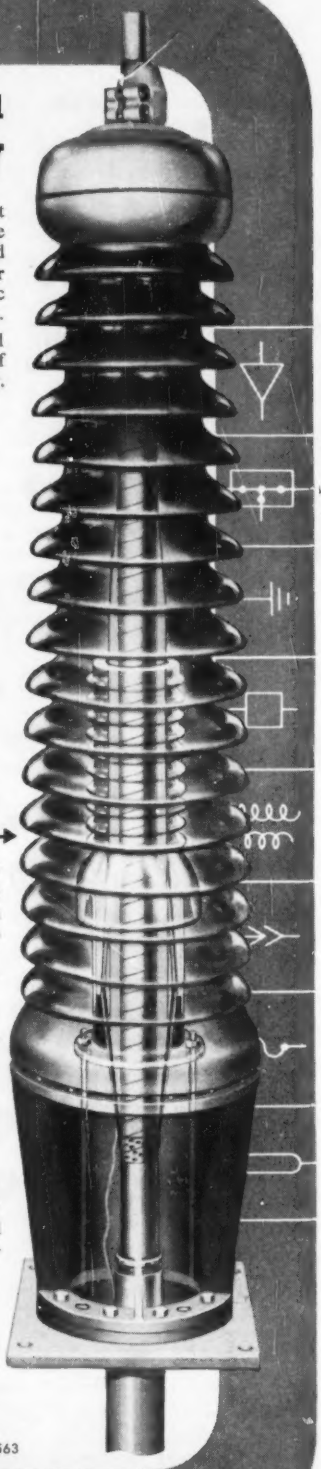
High Pressure . . . Oil Filled
POTHEADS by G&W



Proper treatment of mechanical and electrical stresses permit this simple G&W design. Full 200 pound pipe line oil pressure is retained by the relatively small bore porcelain shell. Tested at 500 p.s.i. pressure. **No castings are used to seal oil under pressure.** Top and bottom fittings are fabricated non-magnetic stainless steel—sealed by fully retained "Resistoyl" gaskets.

Stress relief cone, supplemented by porcelain stress control tube, makes efficient use of the internal diameter and length of porcelain shell—and reduces the amount of installation labor.





G&W Type "ATA" (high pressure) and Type "ATL" (low pressure) oil filled potheads in each voltage class meet the FULL level of electrical characteristics established by American Institute of Electrical Engineers Standards No. 48—WITHSTAND TEST VOLTAGES.

RATED VOLTAGE Kv.	60 cycle Tests RMS Kv.			Impulse Tests
	1 minute Dry	10 seconds Wet	6 hours Dry	1.5x40 ms, Crest Kv. Full Wave
69	175	145	118	350
92	225	190	139	450
115	280	230	163	550
138	335	275	191	650
161	385	315	221	750
230	545	445	315	1050

G&W has supplied potheads (including 230 Kv.) for many of the important oil filled cable installations in U. S. A. and foreign countries. G&W cooperates fully in furnishing complete installation instructions.

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A563

Presidents Must Set Nuclear Power Course

Electric company presidents will meet within the next two months to chart the industry's future course in nuclear power development. This special conference will test the courage of the industry's top executives. It offers them an unparalleled opportunity to exercise broad industry statesmanship that will capture the imagination of the country.

The stage for this meeting has been set by the atomic power resolutions adopted by the Edison Electric Institute Board. These resolutions imply that electric companies are willing to accept responsibility for the development of promising power reactor types. They go further to recommend machinery for selecting the reactor types that merit industry development.

Individually and in groups, electric companies are already pioneering nuclear power development on a sizable scale. In all 44 companies are directly participating in research, development, and construction of nuclear fueled plants. Altogether 116 electric utility organizations have access permits to nuclear power information, which indicates an active interest. Work and planning are in progress on nuclear plants which will have an ultimate capacity of 1.1 million kw and involve the expenditure of some $300 million over the next six or seven years. Certainly this is commendable progress. It is in the industry's tradition of fostering technical advances that will provide more economical service.

But it is evident from the EEI resolutions and the opinions of a number of industry leaders that the industry is dedicated to proceed more rapidly and on a larger scale. Among the critical issues which must be hammered into cohesive industry policy are these:

- How will the industry support its plea for a national reactor evaluation group which would study and recommend reactor types meriting development?

- At what stage in the technical development of a reactor will the industry assume responsibility. Is it to begin after a concept has gone through the pilot plant stage, or should it start earlier?

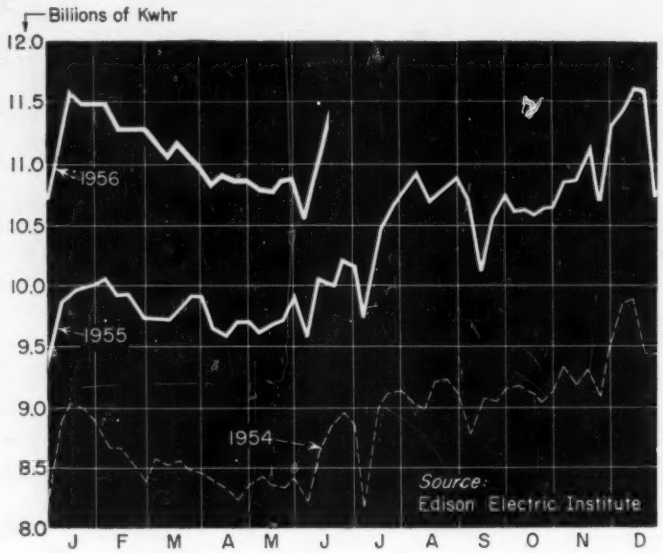
- Should individual and group utility efforts now underway set the pattern for future development of reactor types, or is a more closely coordinated industry program desirable?

- In light of its responsibility to customers and stockholders, how far can the industry go in financing a research and development program? More specifically, will improvements in the technology and economics of nuclear plants eventually justify the large amount of spending being considered?

- How can the industry best get across to the public the story of its nuclear efforts?

The policy finally adopted must fully recognize the need for our country's continued leadership in the nuclear field. But it must, at the same time, fulfill the industry's responsibility to its customers. Such a policy must be firmly based on a careful evaluation of the technical and economic factors that appear likely to govern the industry's future.

ELECTRICAL WEEK



OUTPUT

Week ended June 23
11,478,000,000 Kwhr
Up 12.2%

Atomic Energy Commission requirements—1,125,000,000 kwhr (Electrical World estimate). Excluding AEC, output increase was 10.3%

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
June 23	+12.2	+9.8	+5.8	+17.5	+19.6	+9.3	+17.6	+13.2	+11.9	+7.4
June 16	+14.4	+12.8	+10.5	+18.3	+19.8	+11.2	+22.1	+17.1	+13.6	+7.3
June 9	+9.1	+8.6	+5.0	+11.0	+9.9	+7.7	+14.3	+10.5	+15.5	+4.1

Seasonally Adjusted Index 218.2 Week Ago 220.1 Year Ago 194.8

Issue's Highlights . . . Pictures show wreckage at Schoellkopf plant following June 7 Niagara rock slide . . . Passage of Hells Canyon legislation may raise intricate web of legal points, some fundamental to federal government's authority . . . Senate committee approves change in Public Utility Holding Co Act . . . How Niagara Mohawk Power fought an uphill battle to win referendum at Ogdensburg, N. Y. . . . S. Morgan Smith Co dedicates high-head turbine laboratory capable of simulating up to 300-ft heads.

Possible agreement between Niagara Mohawk and New York State Power Authority on Niagara River power was being hammered out in Washington preparatory to presentation before House Public Works Committee, as EW went to press. First, among several conditions to agreement, was elimination of federal "preference clause," Niagara Mohawk spokesmen said. They sought, among other things, a share of state-developed Niagara River power equivalent to what would be generated by 20,000 cfs of water to which they are entitled by license that expires Mar. 2, 1971. **(With Schoellkopf Station's head of 219 ft this flow produced 334,800 kw. But at proposed Lewiston site head will be 315 ft or 43% greater—Editors.)**

Oklahoma's Grand River Dam Authority is suing federal government for $10-million damages claimed as result of government construction and operation of 49,000-kw Fort Gibson Dam on Grand River. State claims U. S. appropriated its water power rights and upset state plans for developing the river.

"At no time in the last ten years has the federal program been adequate to take care of load growth" of the Northwest, a FPC hearing at Pendleton, Ore., is told. C. A. Erdahl, chairman of Pacific Northwest Utilities Conference Committee, says "non-federal development has never stopped." The session was first of series on proposed hydro development of Snake River.

NEWS OF THE INDUSTRY BRIEFLY TOLD

Washington Wire . . . Congressional fire is still aimed at ECAP advertisement on atomic power development (EW, June 25, p 102) as House Appropriations Committee subpoenas officials of ECAP ad agency, N. W. Ayer & Son. Committee wants to investigate circumstances surrounding the ad . . .

Atomic insurance gets okayed by Joint Atomic Energy Committee. It approves legislation (S 4112) providing government liability insurance up to $500 million for nuclear projects. Proposal requires AEC to determine need and amount of insurance for any licensee of a nuclear project . . . **AEC sets up second Summer Institute on Nuclear Engineering** at Brookhaven National Laboratory. Eight-week course for college faculty begins today . . .

Senate confirms James C. Sargent of N. Y. as member of Securities and Exchange Commission, succeeding Clarence H. Adams . . . **David A. Hamil is sworn in** as new REA administrator. Declaring he plans to spend good deal of time in the field getting "first hand knowledge of REA's problems," Hamil leaves immediately for three-week swing around the country.

Mervin S. Coover is elected president of AIEE at summer and Pacific general meeting, San Francisco. He is professor of electrical engineering at Iowa State College . . . **Lamme Medal goes to Dr Clinton R. Hanna,** associate director, Westinghouse Research Laboratories . . . New AIEE vice presidents are: H. H. Kerr, VP of Toledo Edison; J. H. Foote, president, Commonwealth Associates; N. F. Rode, electrical engineering professor, Texas A&M; D. E. Garr and L. F. Stone, General Electric; M. M. Ewell, Westinghouse.

Western Massachusetts Co offers holders right to subscribe to 92,237 common shares on 1-for-12 basis, record June 21 to expire July 9, at $37½ to yield 5.87%. Another 10,000 shares are offered to employees . . . **Sierra Pacific Power** offers holders 62,576 common shares on 1-for-10 basis, record June 21 to expire July 6, at $20 to yield 6%, with oversubscription privilege. Stone & Webster group wins underwriting with bid of 50¢ a share compensation . . . Halsey Stuart & Co sells to public $166-million **Grant County PUD #2,** Wash., 3⅞% revenue bonds due 2005 at 99% to yield 3.92%.

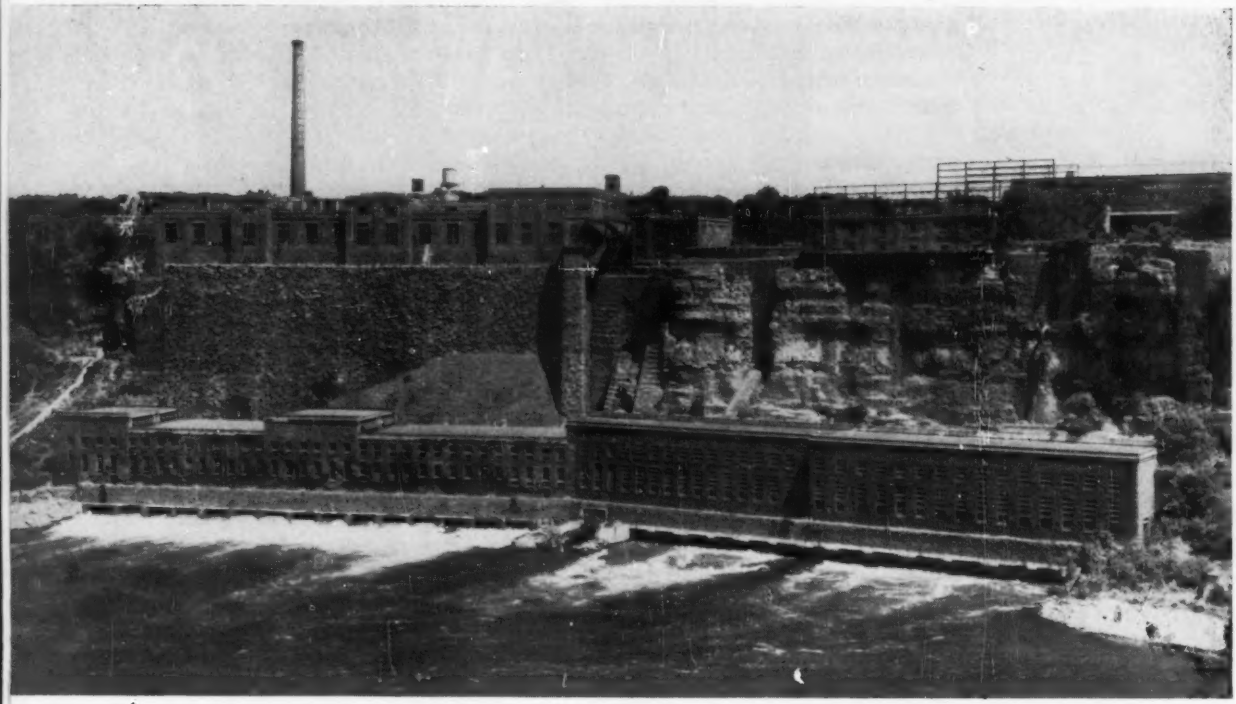
ABOUT PEOPLE IN THE INDUSTRY

Reddy Kilowatt readies for second round of bout with Willie Wiredhand, NRECA co-op symbol, after a federal judge at Columbus, S.C., ruled that Willie does not infringe on Reddy's trademark because "the two figures are not confusingly similar." But Ash Collins, president of Reddy Kilowatt, Inc, "believes the judge was in error" and will appeal the decision to the U. S. Court of Appeals for the Fourth Circuit.

"Recognition and acknowledgment that the character, extent, and effectiveness of **public relations are responsibility of top management"** is fundamental requirement for sound public relations, declares Edwin Vennard, EEI's managing director. He tells Canadian Electrical Association: "First you must live right, and then let people know that you do. When you do those two things, your public relations will be good."

More News About People page 36

At 5:00 PM on June 7 . . .



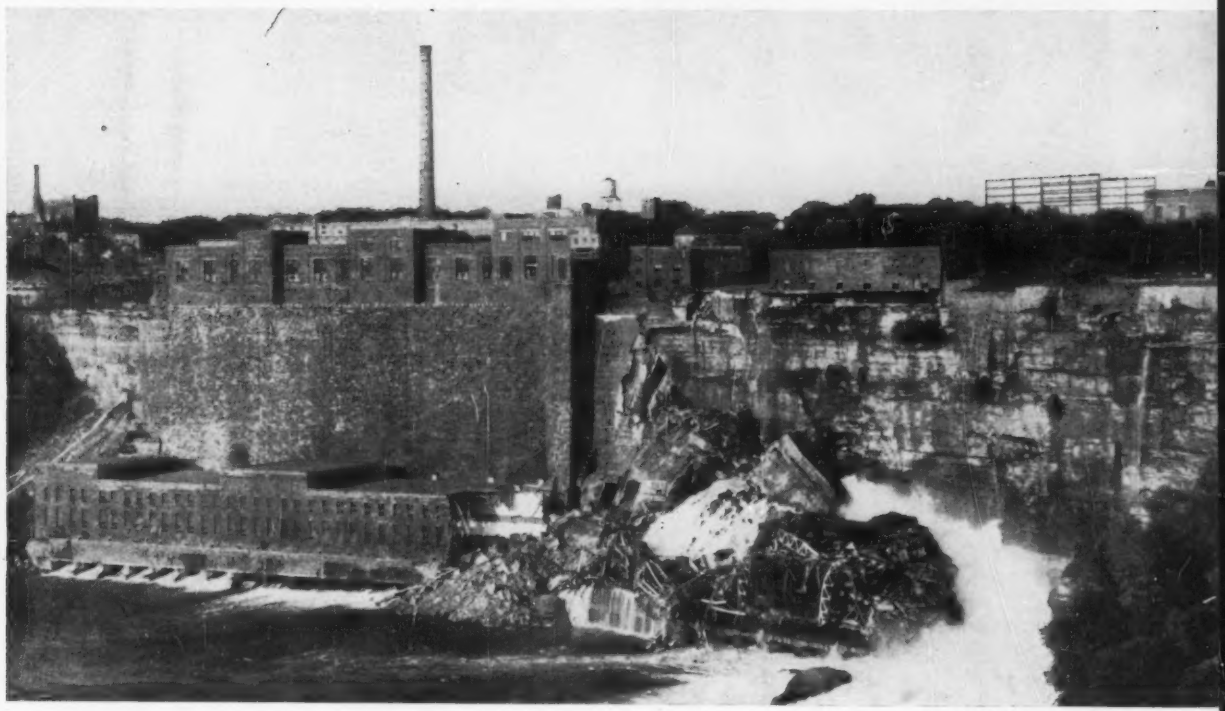
What Happened

For the latest on Niagara Mohawk's negotiations relative to development of the Niagara River, see Electrical Week, p 6

1—ERUPTING under 200 ft of head, water dashes from ruptured penstocks against twisted steel girders, plant rubble

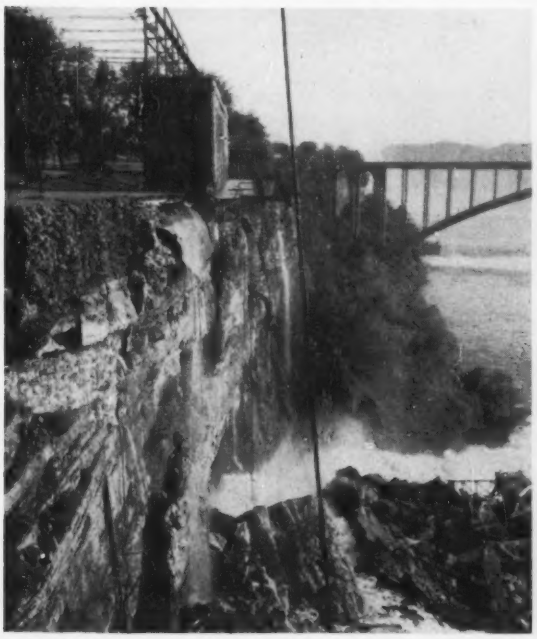
INSIDE SCHOELLKOPF: This scene exists no longer. These three generators of Section 3C and two of 3B were wiped out in the disaster

. . . and at 5:30



at Niagara . . .

2—TERMINAL TEETERS atop rocky crag while dead power cables, snapped in the disaster, dangle into the gorge



3—WRECKAGE becomes more grotesque after water is shut off. Barely visible in the foreground is a damaged machine

Legal Knots Plague Hells Canyon

• Will Congress pass legislation for a single federal "high dam" on Snake River?

• If so, what remains of FPC's authority? And what happens to Idaho Power's license?

• Does 84th Congress have power to change actions OK'd by previous Congress? Some say "no" . . .

Passage of a federal dam bill would open a legal Pandora's box in Hells Canyon. It would raise questions of whether the measure would be valid, and would throw a deep shadow of doubt across the authority of the Federal Power Commission and Idaho Power Co's existing license to develop the Snake River for hydro power.

Another climax in the struggle was neared last week as congressional action for a single federal "high dam" on the Snake River was pushed. The Senate Interior Committee has approved the measure. Now it's up for floor debate. Senate Leader Lyndon Johnson (D-Tex.) says the Senate may get around to it this week.

House Unit Sanctions Bill

Meanwhile, the House Interior Committee finally approved the measure on a 15-to-13 vote, after failing to raise a quorum previously.

Federal dam legislation at Hells Canyon has faced tough obstacles from the start. It is not given a good chance for Congressional approval. But what if Congress does pass it? Observers in Washington believe Eisenhower would veto it and Congress would sustain him.

However, this question arises immediately: What would Congressional passage of this bill amount to? How would it affect other FPC licenses—past, present, and future? Would Idaho Power's license die an immediate and legal death?

Proponents of the federal dam project believe they have a pretty good legal case subject to the problems of licensee reimbursement. The FPC and others argue equally convincingly on the other side.

Powers of Congress Questioned

Perhaps the heart of this matter is whether Congress actually has the power to change an action authorized under a law passed by a previous Congress. The "pro's" cite a memorandum from the American Law Division of the Library of Congress. The "con's" cite Sections 6 and 28 of the Federal Power Act.

PRO: The memorandum was written in response to a query from Rep Clair Engle (D-Calif.). It listed a variety of precedents and said Idaho Power's license "will have no legal effect precluding further action" on the legislation. The fact that a prior Congress has created the Federal Power Act "does not preclude future Congresses from exercising those same powers to change that program or create a new one in its place," it said.

CON: Section 6 of the act says: "Licenses may be revoked only for the reasons and in the manner prescribed under the provisions of this act and may be altered or surrendered only upon mutual agreement between the licensee and the commission after 30 days' public notice."

Section 28 adds "that the right to alter, amend, or repeal this act is hereby expressly reserved; but no such alteration . . . shall affect any license theretofore issued under provisions of this act, or the rights of any licensee thereunder."

Perhaps of more significance at the present is the question of whether Congress would want to choose this route, possibly jeopardizing FPC's entire licensing powers. Passage of the measure probably would stall all major hydro development in the U. S. for two or three years of litigation. Observers are convinced that most congressmen will not be prepared to create this situation.

Review of Utility's License Sought

Further complicating this picture is court action pending in the United States Court of Appeals. Here the National Hells Canyon Association, along with other public power groups, has sought a review of Idaho Power Co's license.

Meanwhile, Idaho Power has spent over $6 million in construction work on its three-dam project and has firm commitments for another $9 million of machines, equipment, and construction materials.

Committee Approves Holding Co Act Change

The Senate Interstate and Foreign Commerce Committee has approved a limited amendment to the Public Utility Holding Co Act of 1935 with an eye on stimulation of nuclear power development.

Sens John O. Pastore (D-R.I.) and Charles E. Potter (R-Mich.) sponsored the measure. The original version of the bill (S2643) was designed to exclude from Holding Act provisions joint projects involving use of hydro power, coal, oil, natural gas, and nuclear power. As revised before it won committee approval, the bill applies only to nuclear power.

Major provisions of the bill are:

• That persons engaged in industry, commerce, engineering, and utilities can cooperate in non-profit atomic power research and development projects without becoming subject to the utility holding company act.

• That ownership of transmission facilities by a joint project is restricted to a "transmission substation and related facilities adjacent to its generating plant."

• That the Atomic Energy Commission can exclude from exemption any company if it determines that the project "is no longer being used primarily for the purpose of research and development."

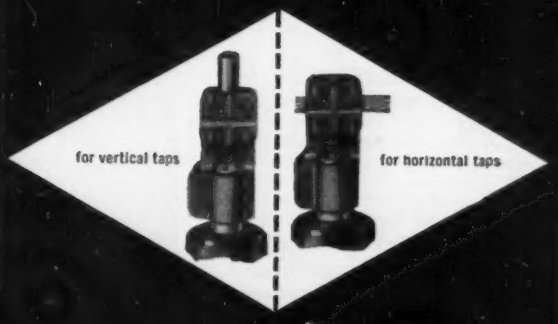
The bill will be referred to the Joint Atomic Energy Committee, but no hearings are expected there. Joint committee members had previously indicated a desire for quick action.

it's NEW! it's [illegible] more versatile!

BURNDY RANGE-TAKING STUD CONNECTOR NDR—
12 sizes with the scope of a hundred . . . designed to meet E E I-NEMA specifications . . . to accommodate cable from #6 solid copper to 2,000 MCM copper; ⅜" copper I.P.S. to a 1¼" copper I.P.S. tubular bus and flat bar. Here's your chance to eliminate a lot of stock-keeping: these 12 items do the work of a hundred!

Constructed of high copper alloy, the NDR stud connector features a reversible cap that permits the full cable, flat bar, or tubular bus range to be taken either in line with the stud or at right angles to it.

Only one wrench is required for installation.



Write for Burndy advance catalog data sheet Stud Connector Type NDR.

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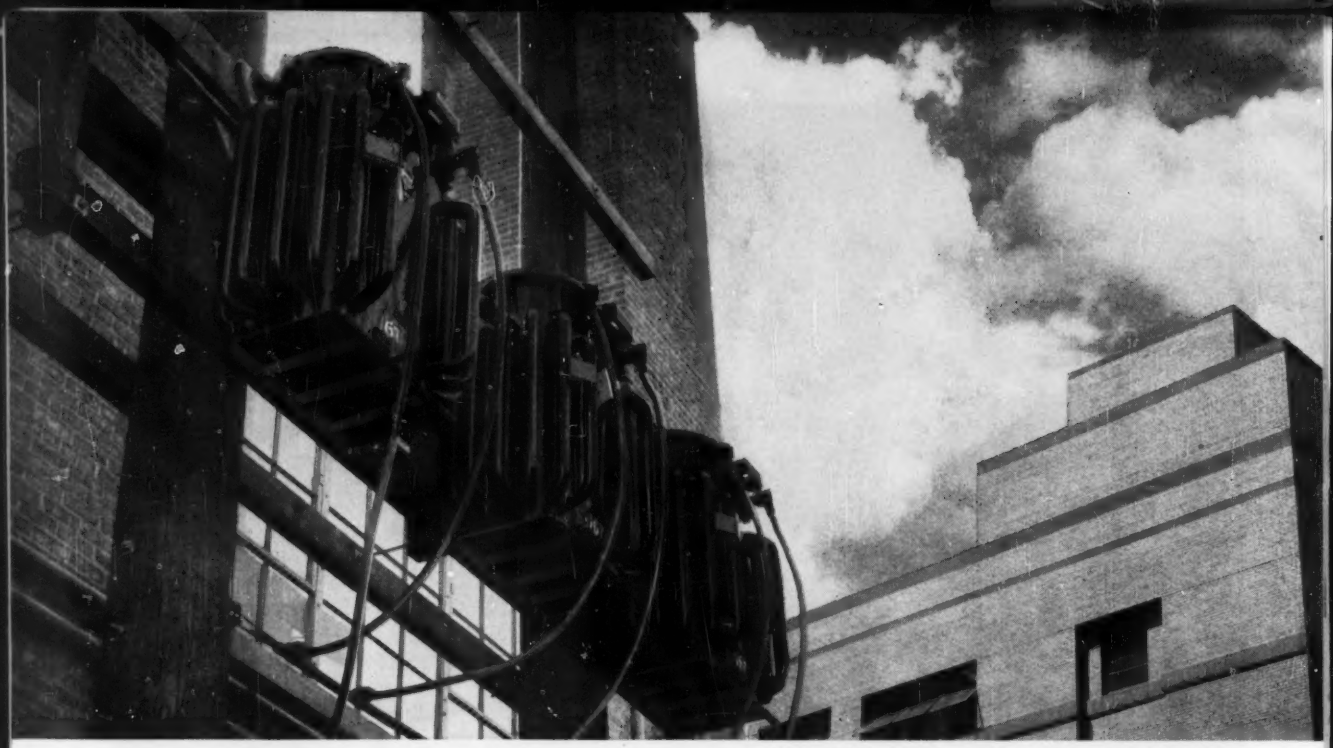


L-M's Round-Wound transformers provide more capacity for heavier short-time overload without sacrifice in transformer life. Because L-M's obround design is lighter, smaller, and has less bending moment than round tank design, three 167's can be hung on a two-pole structure in place of three 100 kva transformers of older design.

For Heavier Commercial Loading

Why L-M Round-Wound® Transformers

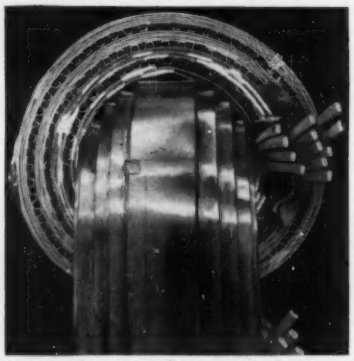
Core-type construction with cruciform cross-section core and round coils provides the most efficient design for lower hot-spot gradient, greater capacity for short-time overload.

By **ROBERT P. THOMPSON**
Manager of Engineering
Transformers
Line Material Company

One of the primary factors that limit the overload capacity of a transformer is the efficiency with which heat from the coils can be dissipated into the transformer oil. Particular care was taken, therefore, in the design of L-M Round-Wound transformers, to assure greatest exposure of coil surface area to cooling oil, and least obstruction to oil circulation.

Cruciform Cross-Section Core

The core is wound of a continuous strip of oriented steel, of varying widths, to form a core of nearly round cruciform cross section. The cruciform cross section of the core provides natural oil passages for cooling between core and coils.



Natural oil passages between cruciform core and round coil help to dissipate the heat from the coils more rapidly. In addition, ducts between windings and between layers in most sizes provide additional oil circulation.

Round Coils and Cooling Ducts

L-M's long round coils expose a relatively large and highly efficient area to cooling oil. Because of this, they provide greater overload capacity than rectangular coil types. In addition, ducts are provided for oil passages between windings and between layers in most sizes, giving exceptionally uniform cooling for the coils.

Core-Type Construction

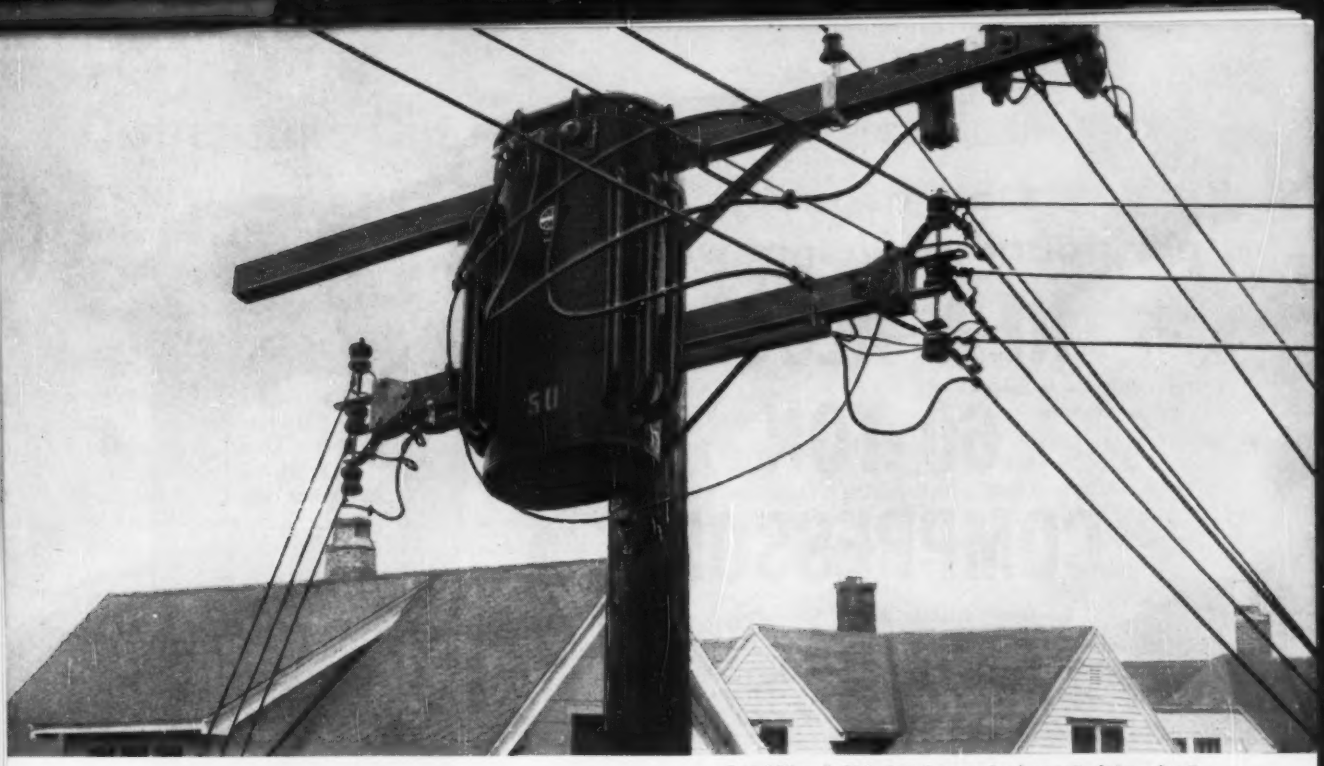
In comparison with shell-type construction, L-M's core-type Round-Wound transformer has greater outer coil surface exposed to cooling oil; therefore coils are cooled more rapidly and uniformly. The cooling surfaces of shell types are partly blanketed by core steel; oil circulation is more obstructed.

Lower Hot-Spot Temperature, Higher Overload Capacity

Because L-M's Round-Wound design provides more efficient dissipation of heat from the coils to the oil, it has appreciably lower hot-spot temperatures during overload. This permits higher short-time overload, or longer overload periods, or greatly increased over-all life of the transformer.

LM® LINE MATERIAL

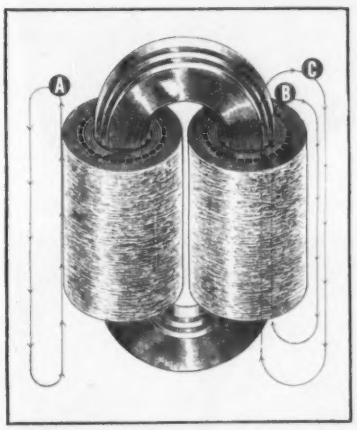
A McGRAW ELECTRIC COMPANY DIVISION



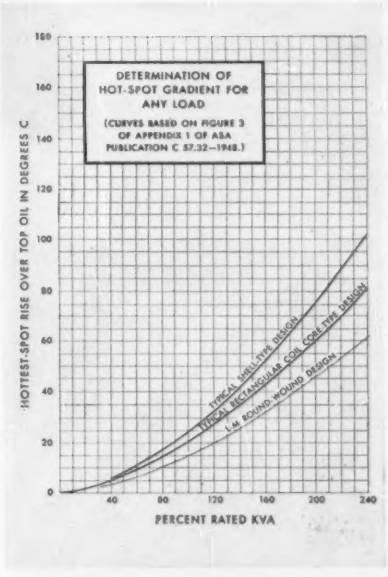
Round-Wound's high short-time overload capacity helps solve the more difficult *summer* overload problems in residential areas. The efficient cooling system in L-M transformers keeps hot-spot temperatures lower under high short-time overloads, increasing the capacity for overload and reducing the possibility of insulation damage.

For Heavier Residential Loading

Have Higher Overload Capacity



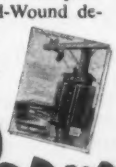
Because L-M transformers expose large, unobstructed areas to cooling oil on the outside of the coil (A), between core and coil (B), and between windings and layers (C), heat is dissipated into oil more rapidly and uniformly during overloads.



The higher the gradient at rated load, the more rapid is the rate of increase in the gradient with overload. Note that L-M's Round-Wound transformer, with a *lower* temperature differential (gradient) between hot-spot and top oil at rated load, has a greater capacity for overload.

Get Complete Information

Ask your L-M Field Engineer for complete information on L-M's Round-Wound design, and bulletins. Or write Mr. Thompson at Line Material Company, Transformer Division, Zanesville, Ohio.



Transformers

Five Reasons Why More Customers Are Selecting L-M Round-Wound Transformers

1. **Higher Uniform Impulse Level:** Round coils are *wound* into shape. Therefore insulation is not damaged by malleting into rectangular shape. Coils have longer creepage distance between windings and between leads.

2. **Higher Short-Circuit Strength:** Round coils are not stressed out of shape under high radial short-circuit forces. Strong steel frame, heavy clamping bolts, sturdy maple blocks and varnished coils prevent axial movement.

3. **Higher Short-Time Overload Capacity:** Round coils and the cruciform cross-section core expose large surfaces to cooling oil. The result is relatively low hot-spot temperatures, which add considerably to high short-time overload capacity.

4. **Balanced Performance:** The core is a continuous wound strip of oriented steel. Coils are wound directly onto this core. Since the core is not cut, unwound, or disturbed in any way after annealing, there are no air gaps to break up the flux path. This results in low exciting current and core loss.

   The wound-core, round-coil design permits fewer winding turns and smaller turn diameter. This results in low impedance, and provides better regulation at all power factors.

5. **Additional Capacity on Pole:** L-M's new obround tank design makes the unit smaller and lighter, with shorter moment arm from the pole. This combination reduces the bending moment on the pole and crossarms, and thus greatly increases the potential capacity of existing transformer structures.

Most capacity per pound of weight with the

NEW ALCOA 60-TON COMPRESSOR

• PORTABLE • FAST ACTION

• LARGE RANGE OF CONDUCTOR SIZES

A thrust of 60 tons in a tool weighing only 42 pounds is now possible with the new Alcoa® 60A Compressor. Designed to apply compression fittings on ACSR or stranded aluminum conductors up to two inches in diameter, the new compressor offers more versatility than any other tool available today. Hand- or power-operated pumps are available for the compressor. For more information on the model 60A compressor, contact your Alcoa representative or write ALUMINUM COMPANY OF AMERICA, 2306-G Alcoa Building, Pittsburgh 19, Pa.

THE ALCOA HOUR—Television's Finest Live Drama, Alternate Sunday Evenings

Your Guide to the Best in Aluminum Value

ALCOA ALUMINUM
ALUMINUM COMPANY OF AMERICA

HEAD LOCKS in position, can't fall out, unlocks at press of finger. Dies also lock in position, release at push of button. Simplicity with light weight is chief advantage.

PORTABILITY is a main feature. Man on right carries compressor and stand; man in center has gasoline-engine pump, 60 pounds; man on left carries connecting hose and accessories.

FAST ACTING compressor in use on ground. On structures, two men can handle both pump and compressor units. Or, if desired, long pressure hose is available.

Distributors Dig In to Fight Business Losses

- **NAED plans counter-attack on new methods of distribution now whittling away wholesaler's profits**
- **Fiercest enemy is rapid growth of nationwide brokerage operations which compete with wholesaler directly**

Worried by new methods of distribution which threaten to take away his business, the electrical wholesaler is digging in for action.

Meeting in Atlantic City, 1,000 members of the National Association of Electrical Distributors took a long hard look at their problems, then came up with this plan of attack:

Study means of streamlining their own operations.

Emphasize to manufacturers, consumers, and the entire electrical industry the importance and worth of the distributor's services.

Tops among the distributor's concerns is the growth of nationwide brokerage operations which compete with the distributor in his local territory. Among others: shrinking profit margins, growth of discount houses, and direct factory sales to builders.

"The manufacturer," said Arthur Hooper, NAED's executive director, "has asked the distributor to take a business risk (by handling his goods). He cannot, in good conscience for any sound business reason, permit a brokerage firm to ship the same goods into that territory."

Hooper also had other words for manufacturers:

1. Stop assuming some of distributor's functions, such as allowing their own salesmen and agents to quote prices and make sales.

2. Reappraise the value and services of the full-functioning wholesaler as against "partial services rendered by the half-steps in the trade channel" and compensate him accordingly.

3. With the stepped up race of obsolescence, help the distributor move older items to areas of the country where there still is a demand.

4. Eliminate outmoded products.

Another problem is the squeeze on profit margins. Partly responsible for it, said two speakers, is that the distributor is assuming more obligations than he properly should.

Reports from NAED's various committees brought out these points:

• On Industrial, Commercial, and Outdoor Lighting: A clearer definition is needed of the "or equal" clause in lighting fixture installation contracts. More active distributor support was urged for the National Lighting Bureau's Certified Lighting program.

• On Wires, Cable, and Armored Conductor: There is too much confusion of nomenclature in the many types of wire being produced.

• On Electric Housewares: Manufacturers should give more help in reducing costs of handling and should keep distributor better posted on far-reaching policy changes. Survey of 70 distributors' operations in 1956 first quarter showed eight of them had quit handling housewares because they did not pay; 18 said sales were down; 18 more said sales were up, but profits down; 54 hadn't been able to cut handling costs; six more said handling costs had jumped.

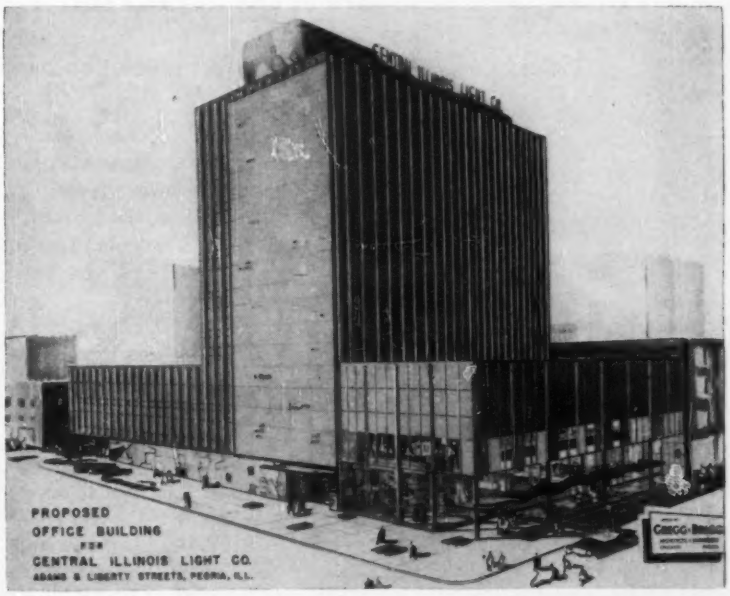
• On Low Voltage Distribution Apparatus: More uniformity needed in description of various types of panelboards, unit breakers, and switches; more standardization wanted in the placing of knockouts.

• On Motors and Motor Control: More manufacturer help desired in training distributor salesmen.

• On Electric Heating: Each distributor should train a specialist and make sure installations are of maximum efficiency to assure customer satisfaction.

• On Residential Lighting: A "more realistic basis" for pricing of fixtures is needed, as well as closer liason with architects in order to upgrade fixture allowances.

Before adjourning NAED members elected Ralph J. Brown, General Electric Supply Co, Bridgeport, Conn., as the new president, replacing Lester E. Barrett, Barrett Electrical Supply Co, St. Louis, Mo.



Central Illinois Light to Get New Office

This is an artist's conception of a new General Office building being planned by Central Illinois Light Co for erection in Peoria, Ill. To be nine stories high, the building will have about 100,000 sq ft of floor space. Construction is to start this summer, and the building is scheduled for completion in the fall of 1958

Old world and new: Indians bathe in Konar River opposite 150,000-kw Bokaro power station. Plant burns low-grade coal

Will Power Bring India Prosperity?

Indians hang hope for industrial revolution on multi-purpose project

Kilowatts are guarded by watchman armed with spear to ward off animals

A large multipurpose project is India's hope to bring power and prosperity to an 8,000-square mile potentially rich industrial region near New Delhi. The state-owned project is now underway with the triple objective of power generation, flood control, and irrigation with navigation.

When W. L. Voorduin, Tennessee Valley Authority engineer, outlined this project eight years ago, he blueprinted a dream that India has had for many years.

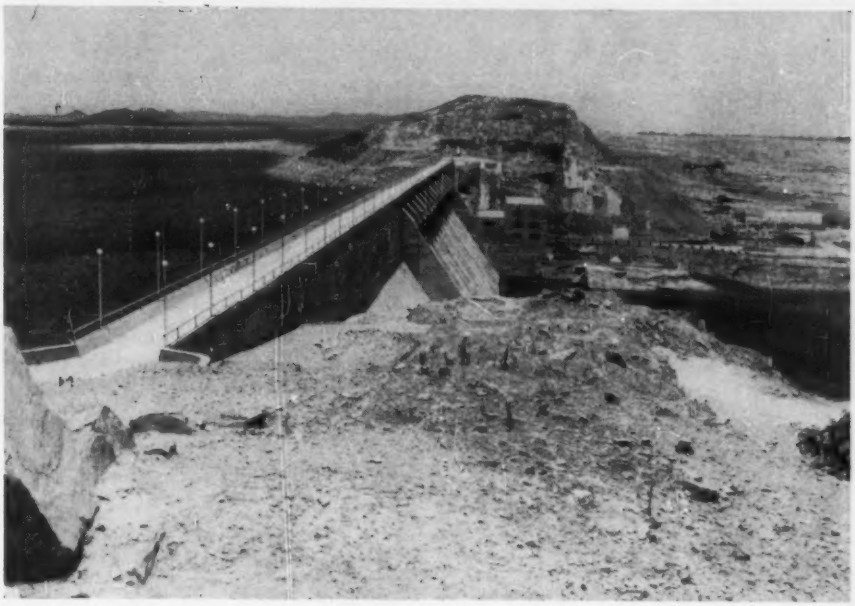
Since then $150 million has been poured into the Damodar Valley Corp, a statutory authority created in 1948. It has planned and constructed a number of projects aimed at unifying the development of the Damodar River system and also at bringing India's potential Ruhr into prosperity.

In the Damodar Valley lie 80% of India's coal, 98% of its iron ore, all its copper and kyanite, and a great deal of mica and chromite. Already producing in the area are aluminum plants, copper refineries, iron and steel mills, textile mills, and glass and ceramics works.

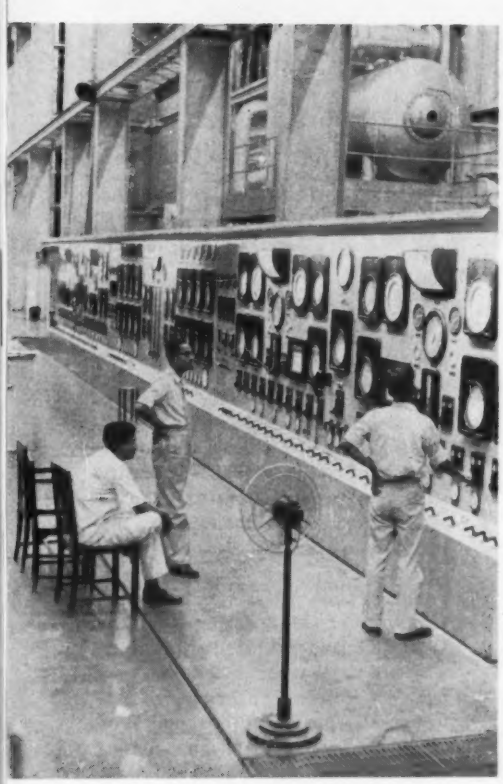
Damodar Valley Corp now supplies 154,000 kw of power. By 1960—the end of the first construction phase—DVC plans to have 144,000 kw of hydro and 200,000 kw of thermal power.

The projected development of Damodar Valley includes seven multipurpose dams, each with a power station. The DVC transmission system will comprise 723 miles of 132-kv lines, 114 miles of 33-kv, 15 grid substations, and 17 receiving stations.

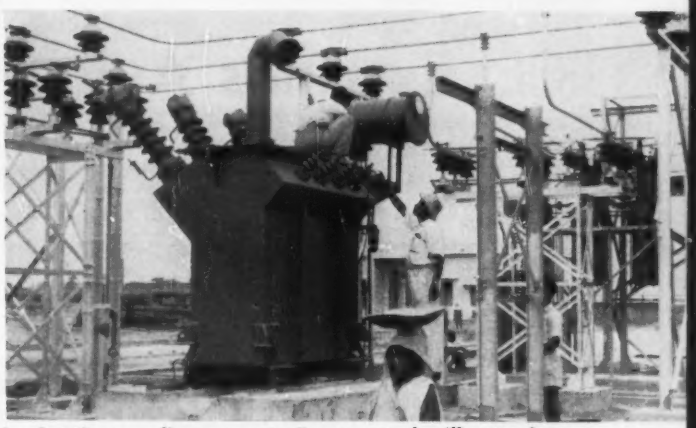
Damodar Valley Corp is not India's only multipurpose project, but it is generally agreed to be the most important. It has set the pattern for all such state-owned projects now being developed in India.



Tilaiya Dam with powerhouse is first of seven multipurpose dams being built by Damodar Valley Corp under huge project for unified development of India's Damodar River system. This all-concrete dam, constructed in three years, was opened in February 1953

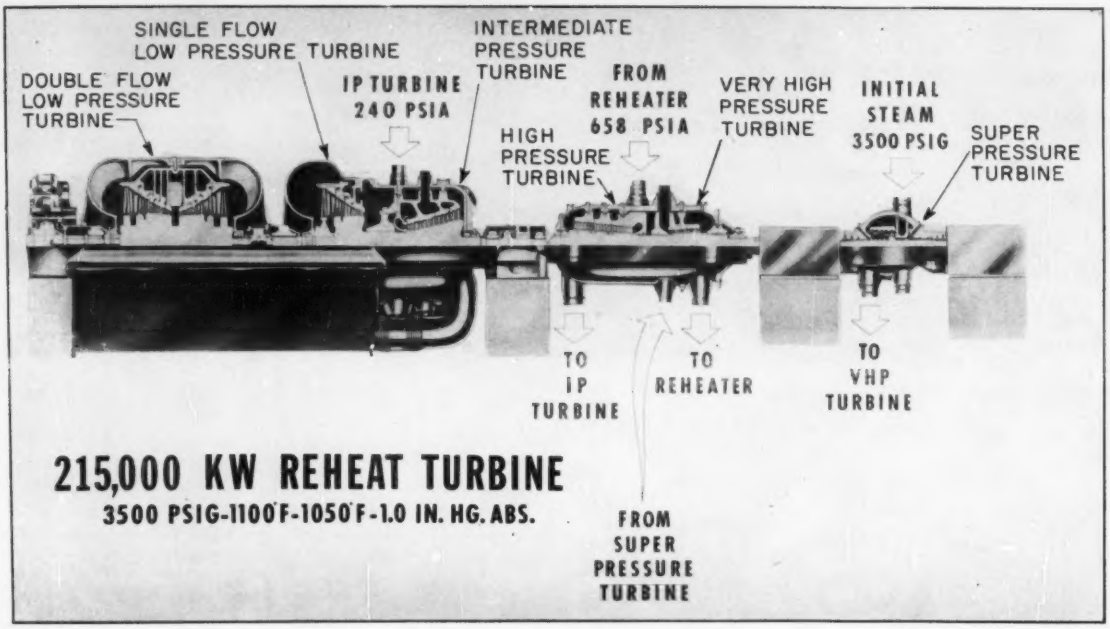


Indians man control panels inside Bokaro power station. It is operated wholly by Indians, under Indian supervision, and by a staff trained mostly by DVC



Balpahari substation supplies power to Burnpur steel mill extensions and to new industries settling in the potentially rich industrial region

Kalipahari substation, currently under construction, is in grid system which will comprise 723 miles of 132-kv and 114 miles of 33-kv lines



CEI Expands Avon at 3,500 Psi

GENERATION
Design

Economic studies and a desire to advance the art justified 3,000 to 3,500 psi range. Anticipated operating problems at pressures just below critical favored move to 3,500 psi

The third supercritical pressure generating unit to be designed for an American central station will use 3,500 psi as the most logical pressure in the supercritical range. Cleveland Electric Illuminating Co chose this pressure for its 250-Mw addition to Avon station.

Significant features of this supercritical installation include:

1. Monotube once-through boiler with hydraulic controls for feedwater regulation, main steam temperature, and turbine by-pass.

2. Throttle steam conditions of 3,500 psi, 1,100F with single reheat to 1,050F. Superheater outlet pressure is 3,950 psig.

3. Use of both motor and turbine-driven boiler feed pumps. Motor drive provides startup power and emergency backup.

4. Plant heat rate of 8,620 to 8,605 Btu per kwhr depending on feed pump drives in service.

5. Use of extruded pipe for main steam lines, with ferritic material from boiler stop valves to the turbine. Austenitic pipe connects superheater outlets to boiler stop valves.

6. Use of a condenser by-pass water treating system permitting unit to operate at full load for 24 hr despite condenser tube leaks.

7. Two strings of high-pressure heaters without individual heater by-passes. Arrangement was most economical and still gives flexibility by permitting almost full load operation with one string out of service.

8. Pumping of heater drains into condenser instead of into condensate stream between two lowest heaters. Extreme water purity requirements dictate this arrangement.

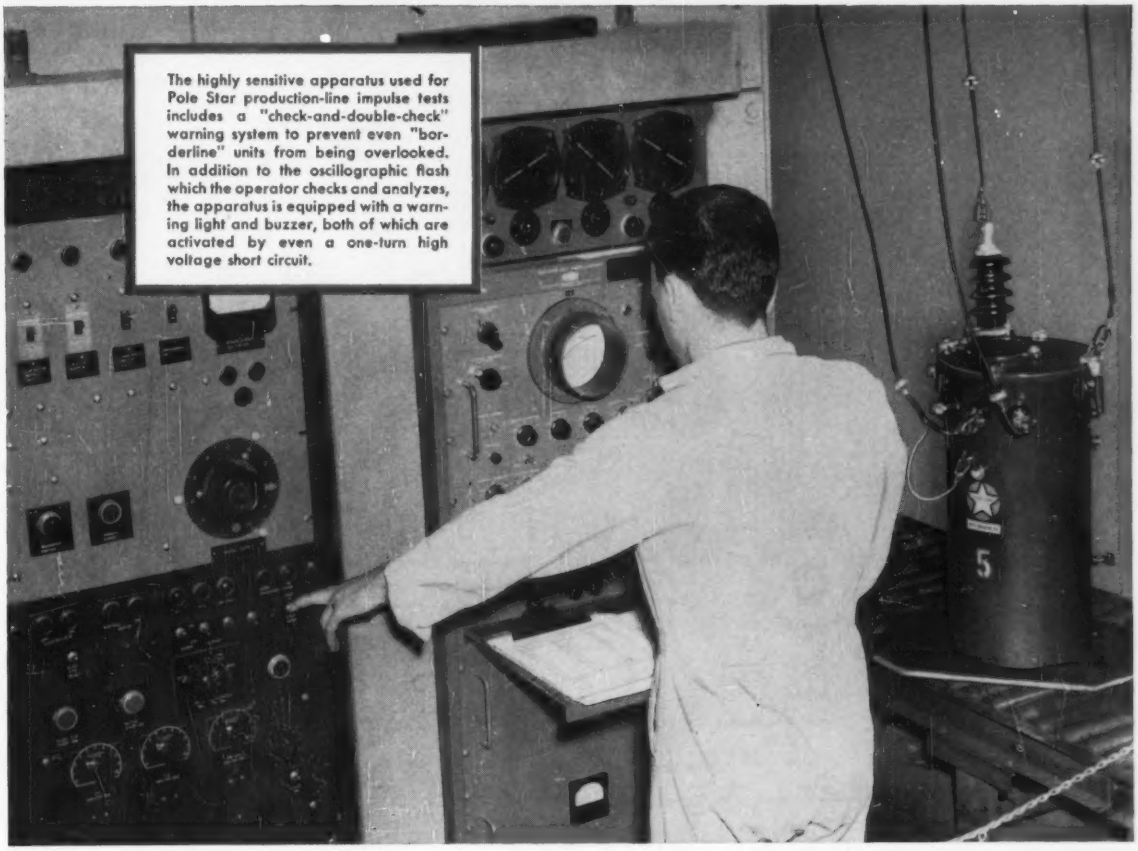
C. A. DAUBER, Director of Civil and Mechanical Engineering, Cleveland Electric Illuminating Co, Cleveland, Ohio

Engineering work on the supercritical addition began in August 1955. Present plans are to have the unit in operation late in 1958. Extensive studies were carried out to establish the location, its optimum size, and the most economically desirable steam conditions.

Site location choice was between a recently-purchased location on the Ohio River and several sites in various stages of development within the company service area. In making the selection the plant dispersal policy of the U. S. Defense Dept. was considered. By choosing to extend the Avon Plant, it was possible to obtain a certificate of necessity for a five-year amortization of 65% of the plant investment.

Cost analysis indicated that savings in coal delivery charges for the

(*Continued on page* 20)



The highly sensitive apparatus used for Pole Star production-line impulse tests includes a "check-and-double-check" warning system to prevent even "borderline" units from being overlooked. In addition to the oscillographic flash which the operator checks and analyzes, the apparatus is equipped with a warning light and buzzer, both of which are activated by even a one-turn high voltage short circuit.

He's checking the POLE STAR's impulse before giving it a clean bill of health

After Pole Star distribution transformers have passed all required ASA and NEMA tests*, they are given a series of final checks to make absolutely certain they are just as dependable as their name implies. Every Pole Star from 3 through 100 kva, 18 kv and below is *completely impulse tested without arresters* — being subjected to production-line tests that simulate the impulse surge conditions likely to occur throughout the entire transformer during actual service.

Such thorough testing of each Pole Star's resistance to impulse surges is accomplished by checking the effect of surges between layers and turns as well as to ground.

The apparatus used for detecting failures during these tests is so sensitive that it will disclose *even* a one-turn high voltage short circuit.

This rigid quality control — typical of Pennsylvania's production methods — means added years of trouble-free service with Pole Stars, and important reductions in maintenance.

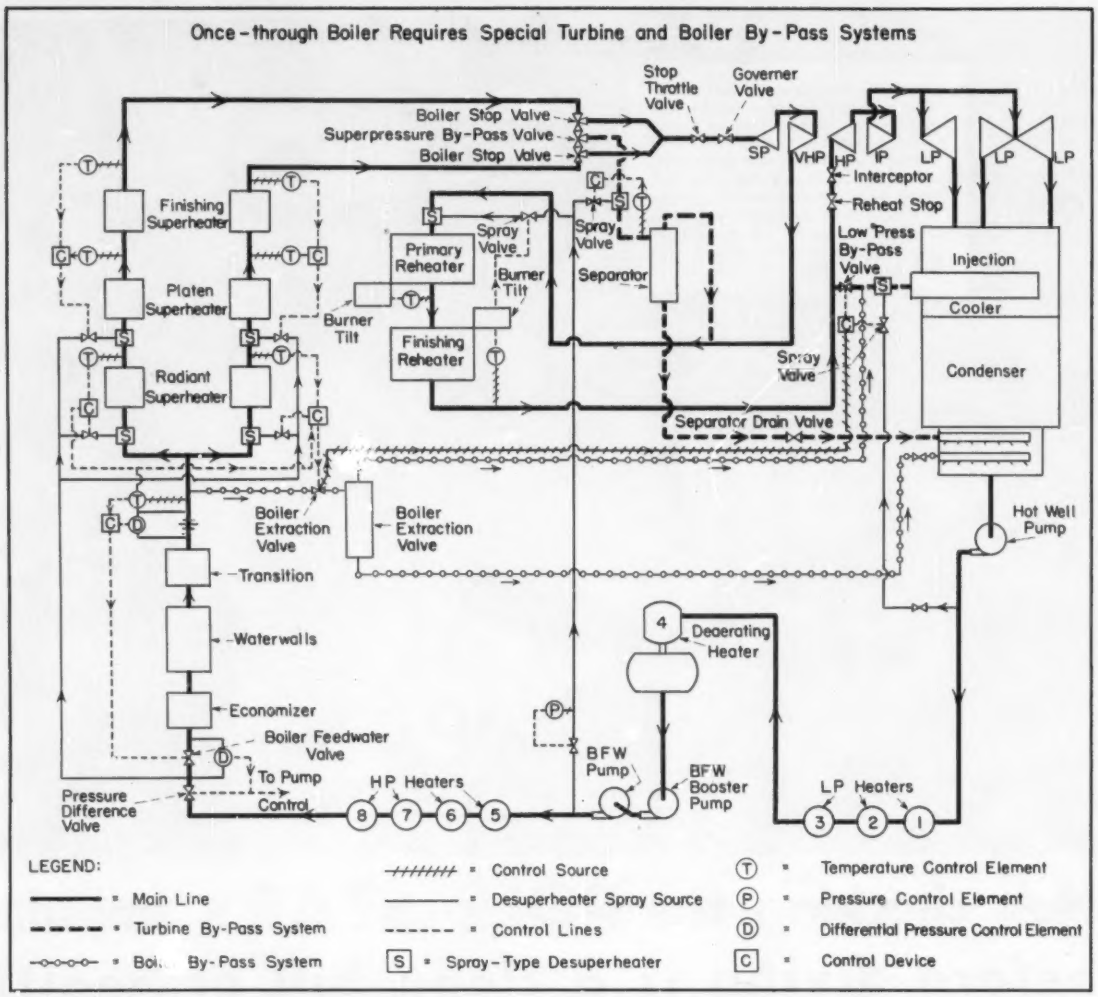
**ASA and NEMA standards require tests for winding resistance, winding and tap ratio, polarity and phase relation, core loss, exciting current, copper loss, and impedance, as well as applied and induced voltage insulation tests. These represent only a partial listing, however, of the numerous tests — both mechanical and electrical — which Pole Stars and their component parts and materials must undergo.*

167 Production Controls make Pole Star Best!

PENNSYLVANIA TRANSFORMER COMPANY

A McGraw Electric Company Division **CANONSBURG, PA.** *Greater Pittsburgh District*

Pole Star Transformers are available in all standard single phase distribution sizes from 3 through 500 kva, through 67,000 volts.



FEEDWATER REGULATION based on temperature, and hydraulically operated feedwater, main steam temperature, and turbine by pass controls are two unusual features associated with boiler. Burner tilt control will be used for the reheaters

river site were not as yet sufficient to overcome the added fixed and operating charges associated with a high-voltage transmission line from the Ohio River site. On the other hand, the Avon site did not involve comparable transmission line costs. Use of money made available by the deferral of taxes through rapid writeoff overcame all other economic factors and justified the selection.

Several heat cycles ranging in throttle pressure from 2,400 psig to 5,000 psig and in temperature from 1,050F to 1,200F were considered. Preliminary calculations narrowed the range to 3,000-3,500 psig and 1,050-1,100F, with single reheat to 1,050F. Because of anticipated design and operating problems with steam at pressures just below the 3,202 psia critical pressure, it was decided to move through this range to 3,500 psig. Furthermore, the company's policy is to select steam conditions one step in advance of the most economical unit in order to contribute to advancement of the art. It was found that ferritic materials could be used to withstand 1,100F main steam temperature. For these reasons, throttle steam conditions of 3,500 psig, 1,100F were selected with reheat to 1,050F.

Space limitations, together with electrical cost factors, dictated the selection of a tandem-compound unit. These considerations were influenced by the location of the new unit.

Maximum capability of the main turbine is 250 Mw with two turbine-driven boiler feed pumps in service. The 3,600-rpm conductor-cooler generator is rated 273,640 kva at 22 kv, 0.85 power factor, 0.64 short-circuit ratio and 45-psig hydrogen. Provision is made for 60-psig operation.

Steam is expanded at full load to 2,000 psia in the steam-cooled "superpressure" section of the tandem-compound, triple-flow turbine. Steam then passes to the "very high pressure" section where its pressure is reduced to 750 psia. Reheated steam returns to the high pressure turbine at 1,050F where it expands to 240 psia. After passing through the intermediate-pressure turbine, the steam enters the triple-flow low pressure sections at 45 psia. The design condenser pressure is 1.0 in. Hg.

Steam will be supplied by a pulver-

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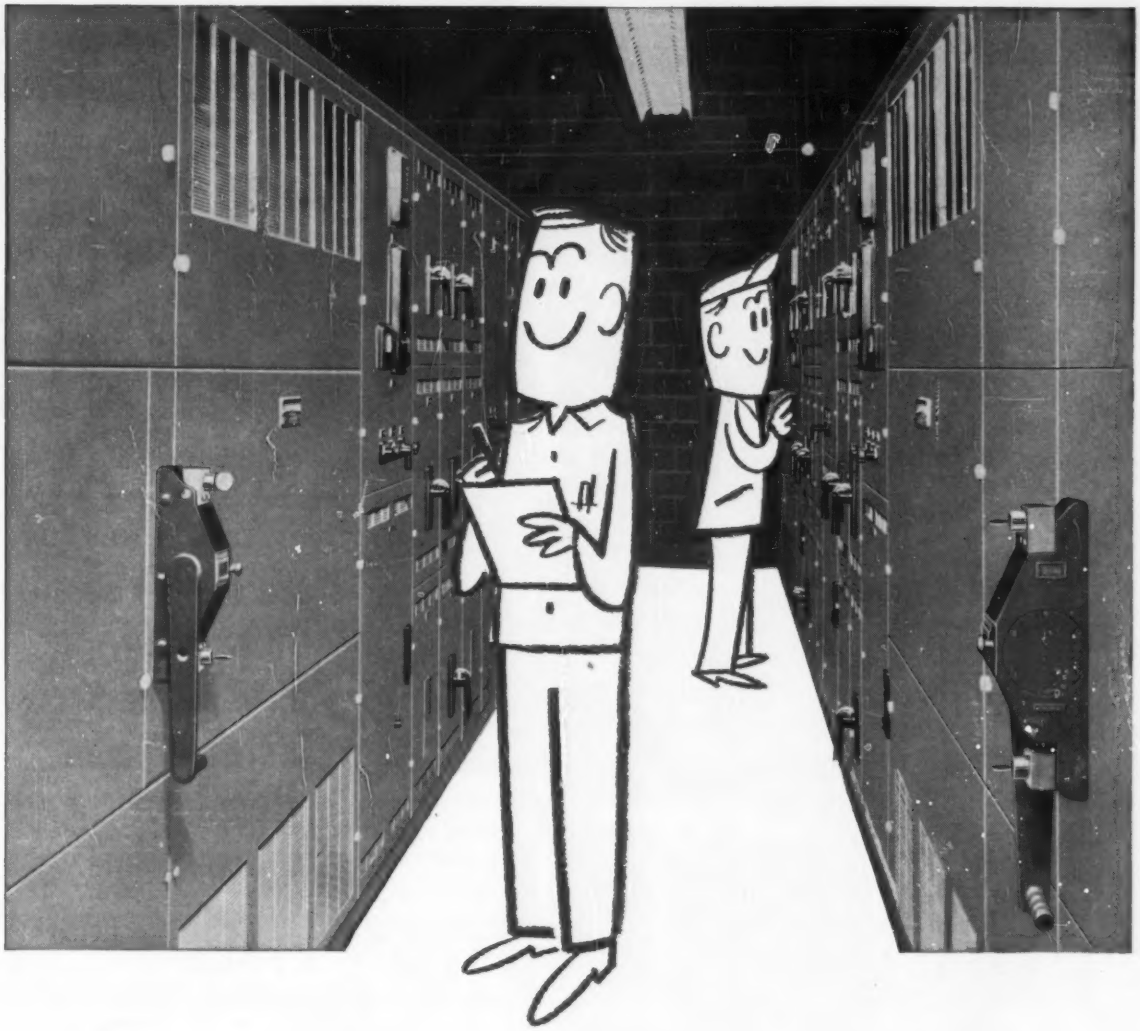


Bring dependable electric power nearer to where you use it —install an **I-T-E** Secondary Unit Substation in your plant

I-T-E Secondary Unit Substations make electric power more dependable, more economical. They bring higher voltages nearer the load, reduce power losses. They increase machine efficiency, reduce voltage drops inherent in long low-voltage runs. They save space—all necessary components are housed in one functionally designed unit. They protect plant personnel—all live parts are isolated and metal enclosed.

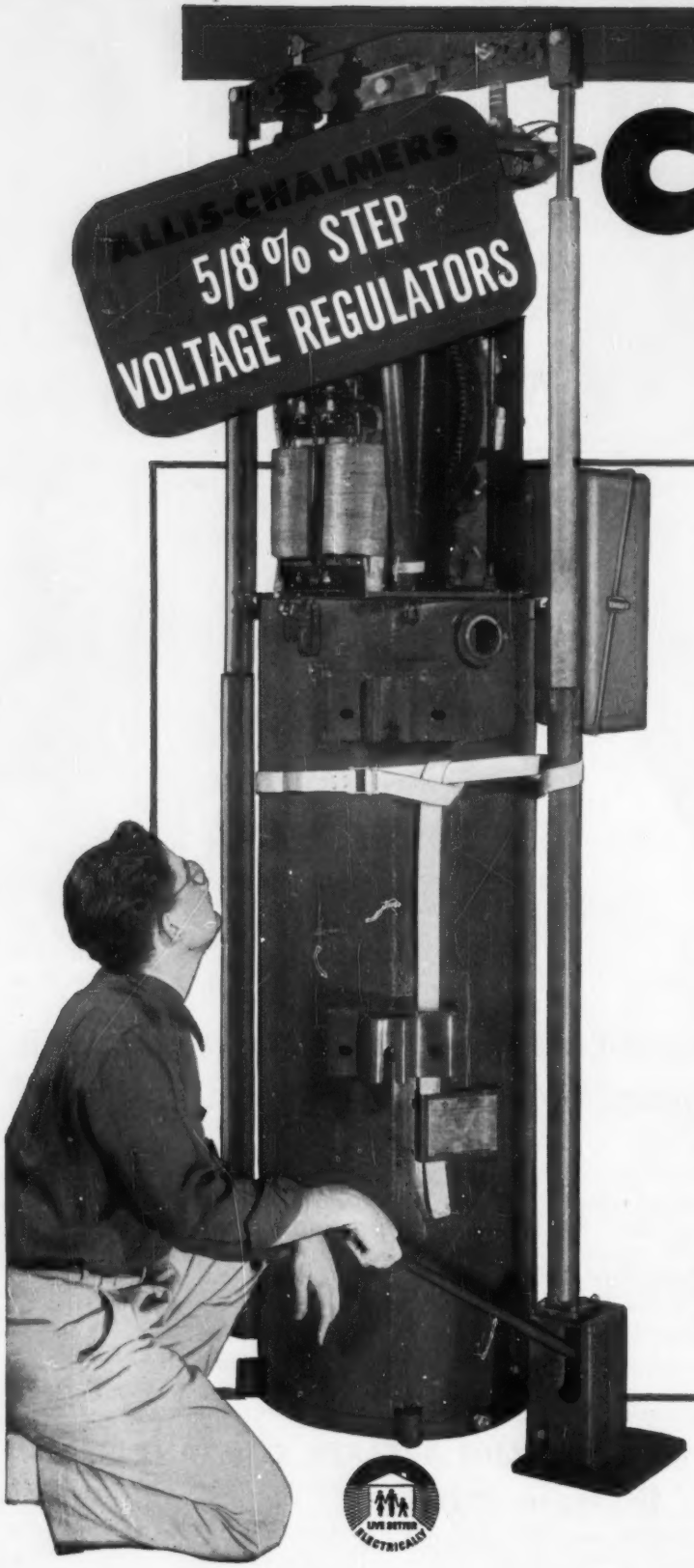
In addition, you save in delivery and installation time. All I-T-E Secondary Unit Substations are assembled, tested and shipped ready to install from one source of supply. And they are available for any application, indoor or outdoor, in any standard rating.

For complete information, contact your nearest I-T-E sales office. Or write I-T-E Circuit Breaker Company, 19th & Hamilton Sts., Philadelphia 30, Pa.

I-T-E CIRCUIT BREAKER COMPANY
Switchgear Division

Compare

Cover Cuts



Here's All You Do to Open Allis-Chalmers Distribution Regulator for Inspection

1. Remove handhole cover and (without tools) disengage position indicator.

2. Remove cover bolts and control cabinet mounting bolts.

3. Attach the hydraulic jack to lifting lugs and hoist for inspection.

LIVE BETTER ELECTRICALLY

ALLIS-

Regulators:

Suspension Inspection Cost 75%

No other regulator offers unit untanking in the field or service shop

Check Operation...

This is the only regulator that can be checked outside the tank without reassembling parts. Simply apply 120 volts to control. Re-tanking, upon completion of inspection, is simple, too.

Compare and save! Ask your A-C office for the story on Allis-Chalmers ⅝% step regulators, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

Eliminate These Time-Consuming Steps

1 Eliminate oil draining and handling.

2 Eliminate disconnecting and removal of bushings and cover.

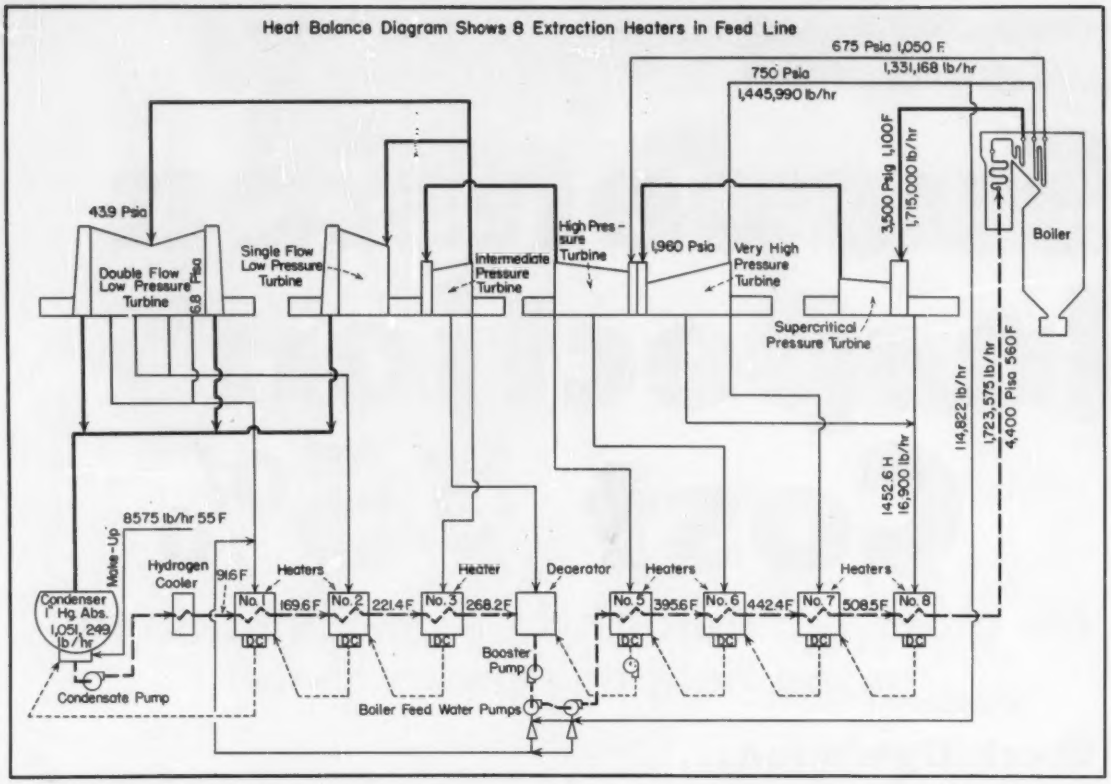
3 Eliminate disconnecting of control wires and holddown bolts.

4 Eliminate piecemeal reassembly.

CHALMERS

A-C ALLIS-CHALMERS

A-5103



ECONOMIC STUDIES favored two strings of high pressure heaters (one of these strings is shown above). Cost advantage also favored one stage of pumping before HP heaters. Heater drains go to condenser due to water purity problems

ized-coal-fired, dual-furnace, monotube steam generator. Corner-firing, tilting, tangential burners will burn the low-ash-fusion-temperature coal. The unit will deliver 1,715,000 lb of steam per hr to the turbine throttle at 3,500 psig and 1,100F with single reheat to 1,050F.

Feedwater, after leaving two parallel lines of feedwater heaters, is divided into four circuits. Two feedwater circuits supply an economizer for each furnace. Flow to the economizers is controlled by individual feedwater control valves. Feedwater then flows to the water walls occupying the bottom half of each furnace wall surface. No conventional downcomers are required. Boiler water makes a number of up-and-down passes in the water walls before entering the horizontal tube transition zone where water is converted into steam. This is located in a relatively cool convection region.

Each of the four steam circuits (two per furnace), on leaving the transition zone, are subdivided into two parallel circuits through a series of radiant, platen, and finishing superheaters. Each of these eight steam circuits include appropriate stop and bypass valves which are used during startup and abnormal operating periods. To maintain uniform steam temperature distribution to the turbine, the leads from the stop and bypass valves are connected into a mixing header. The once-through boiler has five control systems:

1. Feedwater regulation
2. Main steam temperature
3. Turbine bypass system
4. Combustion control
5. Reheat temperatures

Feedwater regulation is based on temperature rather than on drum level. Hydraulically operated controls will be employed for the feedwater, main steam temperature, and turbine bypass system.

Reheat steam temperature control will be electrical design. Because reheater surfaces exist in each of the two furnaces, the temperature control will have two stages. Burner tilt temperature control will be employed in each stage. Final reheat temperature will employ sprays at the reheater inlet for desuperheating as backup protection.

The boiler has four separate circuits, each consisting of an economizer, water walls, transition section, radiant superheater, platen superheater, and finishing superheater. Individual parallel circuits extend from the pressure-difference regulating valves to the mixing header just before the turbine throttle.

Feedwater flow in each circuit is controlled by the steam flow and the temperature leaving the transition zone. The steam flow is used as an anticipation device and the final control is provided by temperature. Maintaining the proper temperature at the outlet of the transition zone matches feedwater flow to firing rate.

The pressure-difference regulating valve is used to maintain approximate 30 psi drop across the feedwater regulating valve. This valve compensates for variation in feed pump pressure and boiler pressure so that the feedwater flow depends exclusively on the position of the feedwater valve.

Speed of the feed pumps is regulated by the pressure-difference valves. If flows are slightly unbalanced in the

(*Continued on page* 26)

One Pull Isolates Voltage Regulator

. . . QUICKLY AND EASILY

WITH THIS

KEARNEY

By-Pass Disconnect

All danger is eliminated when you use this *single-switch* method of isolating voltage regulators. As the switch is pulled open, the regulator is by-passed, both leads are opened and exciting current is interrupted . . . each step automatically, in the proper sequence. The closely-coordinated make-before-break design prevents load disturbance or arcing at the contacts. Not only do you gain safety, but you save money because this KEARNEY By-Pass Disconnect does the job that otherwise would require *three separate switches.*

JAMES R. KEARNEY CORPORATION • 4224-42 Clayton Ave., St. Louis 10, Mo. • *Canadian Plant:* Guelph, Ontario

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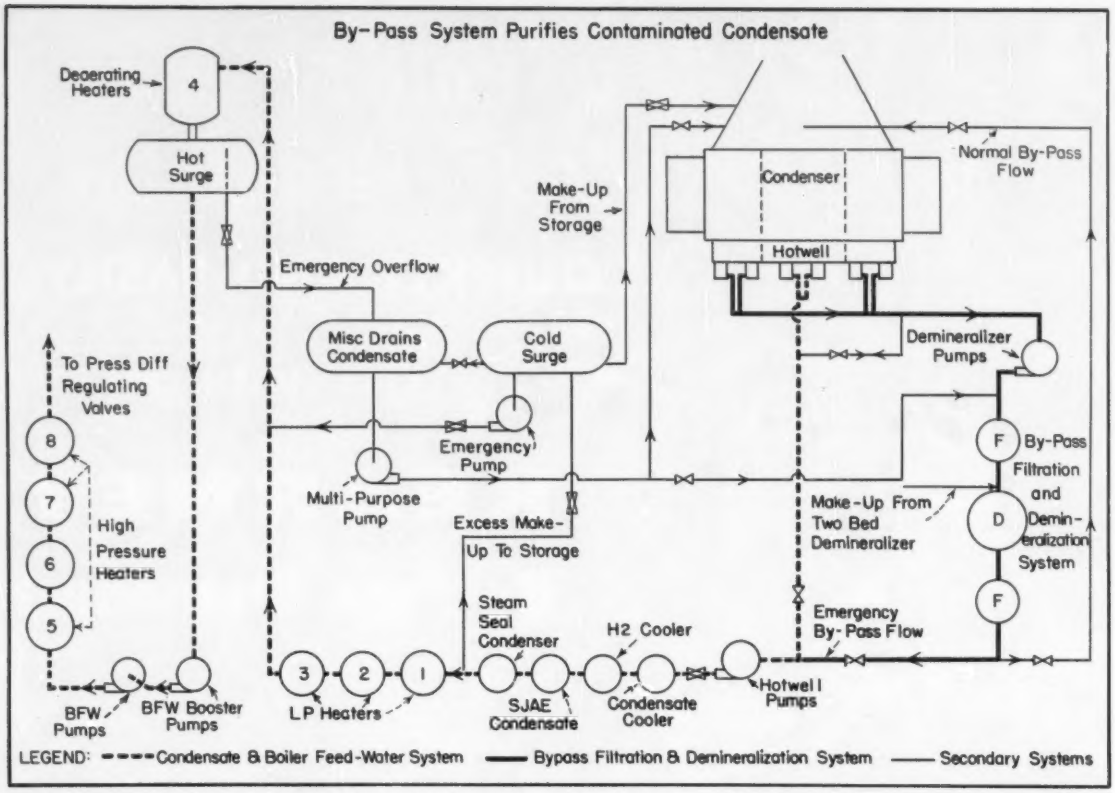
for BETTER CONSTRUCTION
SAFER MAINTENANCE

Specify KEARNEY

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO. GUELPH, ONT.

The Mark of Quality PRODUCTS



LACK OF A BLOWDOWN point in once-through boiler makes water purity extremely important. Bypassing the condensate through filter and demineralizing system in case of contamination will allow the unit to carry full load for 24 hours

four circuits, one of the pressure-difference valves will be opened slightly more than the others. Pump speed will be determined by the widest pressure-difference valve opening. In this manner the pumps will be running fast enough to maintain proper flow in each of the four circuits.

Main steam temperature in each circuit is regulated by spray type desuperheaters located at the inlet of the radiant superheater and at the inlet of the platen superheater. Spray at the radiant superheater inlet is controlled by the temperature leaving the radiant superheater with anticipating impulse from the temperature leaving the transition zone.

Spray at the inlet of the platen superheater is controlled by the temperature leaving the finishing superheater with anticipating impulse from the temperature leaving the platen superheater.

Provision has been made for extracting water at the transition section outlet to reduce the flow through the superheater during unusual operating conditions.

The turbine bypass system is required for cold starts, hot restarts, turbine trips, and abnormal operating conditions. Flow of steam or water bypasses the turbine through the superpressure bypass valve in each circuit. The boiler stop valves close on under pressure or under temperature. The superpressure bypass valves open on over pressure or over temperature, but will close if the bypass line is over temperature from lack of desuperheating water. Superpressure bypass valves discharge into a separator. From here the water is discharged into the condenser. Steam from the separator discharges into the cold reheat lines. Steam travels through the reheater out the low-pressure bypass valves on the hot reheat lines, and into the injection cooler in the condenser neck. The valve for the desuperheating water to the injection cooler is open any time the low-pressure valve or boiler extraction valve is open.

Primary function of the boiler stop valves in each circuit is to prevent water from entering the turbine. On cold startup, water is pumped through the entire boiler to the condenser through the separator. Only when proper steam conditions are established will steam be admitted to the turbine.

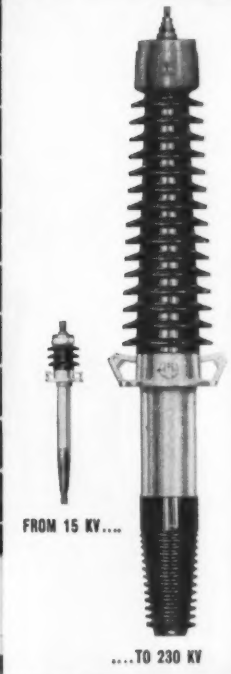
Part of the combustion air will be drawn through a 30-ft deep air well through heating coils by a large centrifugal fan and discharged into the turbine room basement near the feedwater heaters.

There will be three, six-stage main boiler feed pumps each capable of delivering 2,285 gpm (1,026,000 lb per hr) at a total head of 11,580 ft. Two of the pumps will be driven by steam turbines and the third by two 4,000 hp motors in tandem.

Estimated net unit heat rate at rated load and back pressure is 8,620 Btu per kwhr with two turbine-driven feed pumps in service. With one turbine-driven and one motor-driven feed pump in service the unit heat rate will be reduced to 8,605 Btu per kwhr.

Two boiler-feed-pump-drive turbines will receive steam from the "cold reheat" line and will deliver exhaust steam to the lowest stage extraction line. A maximum speed of 7,575 rpm will correspond to an output of 7,650

(*Continued on page* 31)



NEW O-B BUSHING
Works all the insulation ...Overworks none of it

Every new O-B bushing, all the way from 15 to 230 kv, uses "full condenser" construction of the insulating core. Concentric foil layers, acting as plates, decrease in length as they increase in diameter in order to maintain uniform area. During the paper winding operation, spacing of these plates is held to a high degree of accuracy . . . In a condenser where plate area and dielectric spacing are equal, voltage is uniformly divided. In this way, the total bulk of insulation in the O-B bushing is worked efficiently; each dielectric zone taking an equal share of the voltage, and subjected to extremely conservative stress . . . This permits combining the slender form of O-B's new bushing with high operating reliability and generous safety factors at all voltage ratings . . . These bushings are now available for application to your new station equipment.

4642-H

Ohio Brass

MANSFIELD OHIO, U. S. A.

More scope for selection

IN THE FULL LINE
OF GENERAL ELECTRIC CABLES

The General Electric line of hundreds of wires, cables, and cords covers just about every possible need. Typical of these are flame-resistant, heat-, moisture-, and weather-resistant types and special constructions to withstand vibration, the electrostatic effects of adjacent power cables—even the effects of atomic radiation. Thus, G-E engineers are never limited to one cable, cord, or wire for a given job but can suggest the most efficient and economical solution for the particular situation.

This is one of the important reasons why General Electric wire and cable engineers have been able to help many electric utilities and industrial customers with their electrical expansion and modernization programs. Another reason is General Electric's knowledge of the requirements of other basic components of power distribution systems—transformers, load centers, switchgear, etc. — and the importance the right wire or cable plays in satisfactory system performance.

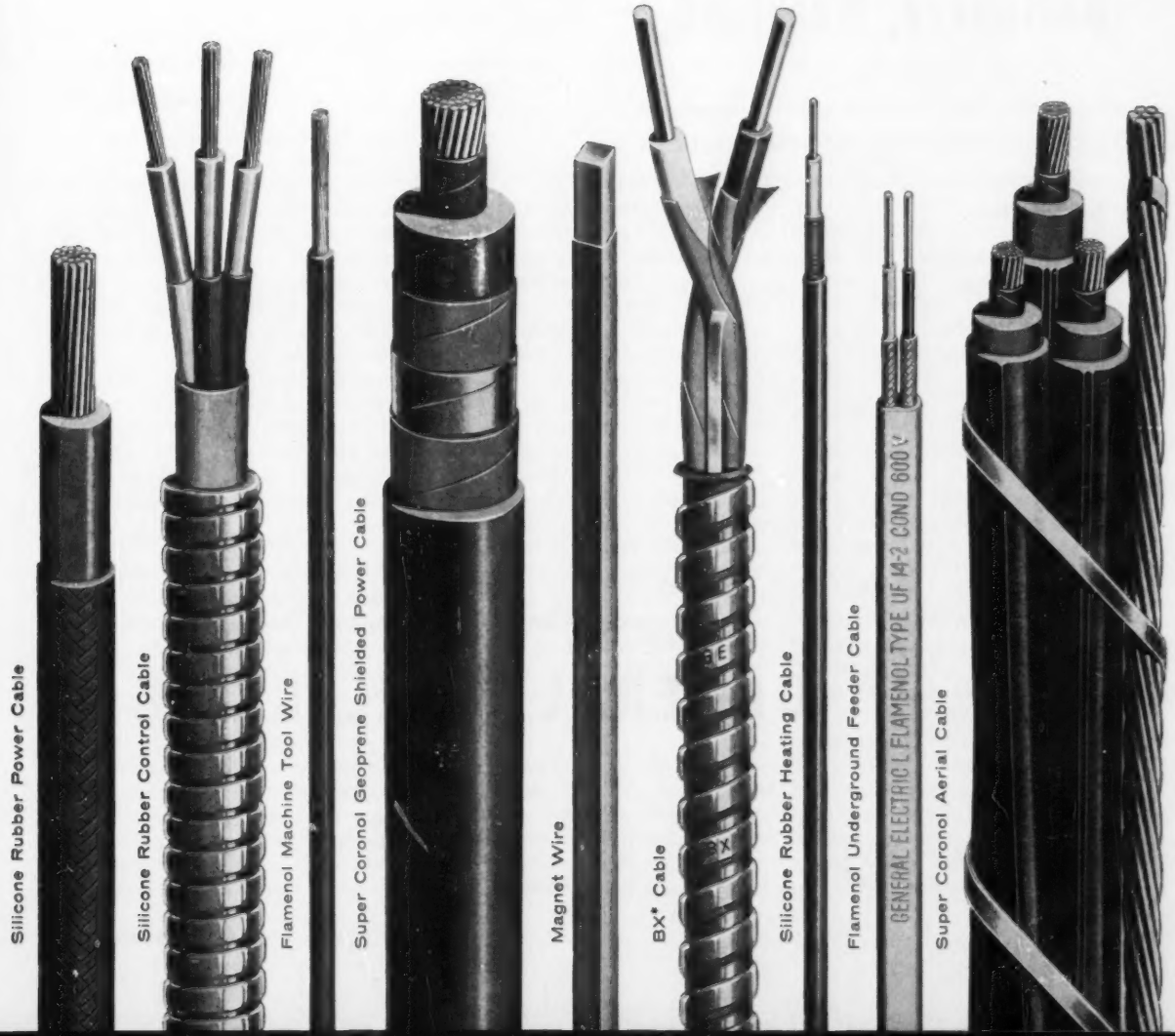
All this adds up to experience . . . the kind that can benefit you. Next time you have a cable selection problem it will pay to take advantage of General Electric's knowledge and experience.

For information on your specific wire and cable application or selection problem see the G-E wire and cable specialist in your locality or write to Section W183-727, Wire and Cable Department, General Electric Company, Bridgeport 2, Connecticut.

*Registered Trade-mark General Electric Company

Progress Is Our Most Important Product

GENERAL ELECTRIC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To better describe our service to the electric power industry, the LOCKE Department of General Electric has changed its name to—

Insulator Department
General Electric Company
Baltimore, Maryland

In its sixty-four-year-old tradition as pioneer in the insulator field, the Insulator Department will continue to originate important insulator developments.

The trademark, LOCKE, will still be used in connection with General Electric insulator catalog numbers.

Progress Is Our Most Important Product

GENERAL ELECTRIC

hp. Conventional flyball governor with speed changer will control turbine speed. Impulses will be received from the feedwater regulating valve.

Dual motor drive limits starting current for the third pump so that standard 4,000-v switchgear can be used. Power will be applied to one motor until up to full speed. Output of the two motors in tandem will be delivered to the pump through a hydraulic coupling and speed-increase gear. It is tentatively planned to control pump speed with a governing device mounted on the speed-increase gear.

Single Stage Favored

One stage of pumps proved preferable to two. Savings in pump power to boost relatively cool water (339 F) to a maximum discharge pressure of 4,730 psig exceeded the savings which would have resulted from designing the high-pressure heaters for a lower pressure. Lower pressures would have been permitted by the addition of a second stage of pumping after feedwater had left the highest pressure feedwater heater. The added cost of two sets of pumps was another factor favoring a single stage.

Save on Valving

Economic studies showed an advantage for two heaters in parallel for each high-pressure extraction stage. Factors considered included: cost of the heat exchanger, piping and valves, and evaluation of space for each arrangement. Bypassing individual heaters was not considered necessary with two strings of heaters. Elimination of valving costs proved to be significant in the cost analysis. Should any high-pressure heater require maintenance, that entire string of heaters will be taken out of service. It is hoped that it will be possible to carry almost full load under these conditions.

Drains Go to Condenser

Original plans had called for the drains of the lowest pressure heater to be pumped into the condensate stream between the first and second lowest pressure heaters to obtain the best possible heat rate. After consideration of water-conditioning problems, however, it was decided to send these drains directly to the condenser. The possibility of significant copper and iron pickup by extraction drains cascading through low-pressure heaters made it desirable to demineralize low-pressure drains as soon as possible.

Feedwater will have the following limitations:

Alkalinity	ph 9.0 to 9.5
Total solids	50 ppb maximum at condensate pump discharge
Total iron	10 ppb maximum
Silica	20 ppb maximum
Oxygen	7 ppb maximum

A condensate bypass filtration and demineralization system will be used to serve three major purposes.

1. Protect feedwater cycle from condenser tube-sheet weepage and condenser tube rupture leakage.

2. "Polish" makeup water from a two-bed demineralizer system.

3. Remove corrosion products.

Two secondary purposes are; to "Polish" miscellaneous drains before returning to the cycle, and to clean up the cycle for original startup and following outages.

A double tube sheet design with pressurized condensate between the two tube sheets was first considered for the condenser. But standard rolled tube sheets sprayed with neoprene will be used to combat condenser leakage contamination. Condenser and hotwell designs will permit demineralization of 95 to 100% of all tube sheet weepage.

Catch Weepage

The condenser, rectangular hotwell, and water boxes will be divided on the centerline parallel to the tubes. In addition to loose fitting tube support plates, the hotwell will have two transverse divisions. These will be located directly below a tube support plate and at a distance of about 18 in. The transverse divisions have been provided to catch 95 to 100% of any tube weepage in the four end sections of the hotwell.

Normally all water in the four end sections will be sent to the bypass filtration and demineralization system. Affluent from this system will be sent to the center section of the condenser for re-deaeration before return to the cycle. Full load design flow for the bypass system is 625,000 lb per hr or 50% of condenser flow. This includes the flow from the low-pressure heater drains.

The bypass filtration and demineralization system has been designed for 100% condenser flow during emergency operation. Tube rupture will be detected at the hotwell pump by precise conductivity measurements. When abnormally high conductivity is detected, all condensate will be sent through the bypass filtration and demineralization system. By designing the bypass system for 100% condenser flow, the unit can hold full load for 24 hrs or longer with no danger of cycle contamination.

Indicate Rupture

The longitudinal division has been provided to determine on which side a condenser tube has ruptured. Conductivity measurements on each of six hotwell outlet nozzles will indicate rupture location. Circulating pump on the side in which failure occurs can be turned off, permitting that half of the water box to be drained. With one side of the condenser out of service the turbine load will be reduced to about 70%. After this half of the water box has been drained and the ruptured tube plugged, the unit can again be operated at full load.

Raw water makeup will be processed through a two-bed demineralizer equipped with a vacuum degasifier. This makeup is polished in the mixed-bed demineralizers which are a part of the condensate bypass system.

The cycle has no special materials, such as stainless steel or rubber-lined pipe, to prevent corrosion. Ammonia or hydrazine added at the hotwell condensate pump and deaeration of the condensate will be used to protect the metals in the preboiler cycle. The system is equipped with a standard condenser with deaeration guaranteed to 0.03 cc of oxygen per liter (43 ppb) and a deaerating heater with deaeration guaranteed to 0.005 cc of oxygen per liter (7 ppb).

Eight Main Steam Lines

Eight main steam lines, 6⅝ in. OD x 4 in. ID, (ASTM Specification A-312, Grade TP316, austenitic material) will be used from the superheater outlets to the boiler stop valves. Each is about 300 ft long. The pipe will be manufactured by the extrusion method of a fine grain material with the same manufacturing tolerances as "seamless" pipe.

On the turbine side of the boiler stop valves, transition sections of austenitic to ferritic material will be used. There will be no change in wall thickness in the weld at this point. Ferritic material will be used from the transition sections through a ferritic mixing header and four ferritic lines to the four turbine stop valves.

Coffin, Reddy Kilowatt Award Winners

Kinsey M. Robinson (above right), president and board chairman of Washington Water Power receives the Charles A. Coffin Award from Ralph J. Cordiner, president of General Electric Co, while Harllee Branch Jr, president of Edison Electric Institute looks on. The award was presented at the EEI's recent convention in Atlantic City, N.J., and is recognition of WWP's action in the Stevens County election (EW, June 11, p 96).

Below, George W. Ousler, vice-president, Duquesne Light Co, who was chairman of the EEI Awards Committee, smiles as Ashton B. Collins, president of Reddy Kilowatt, Inc, presents the Reddy Kilowatt Award to Philip Sporn, president, American Gas & Electric Co. The award was made on the basis of the excellence of AG&E's 1955 annual report.

Builders Fight

. . . against $55 charge which often means gas ranges must be put in

Main and service extension rules of affiliated Southern California Edison Co and Southern Counties Gas Co are unfairly penalizing electric range installations. This accusation was made at recent hearings before a California Public Utilities Commission examiner by representatives of Orange and Los Angeles counties tract builders.

The case against the gas companies was developed by Attorney Wyman C. Knapp, who identified himself to PUC as representing 37 contractors. The gas companies counsel suggested that Knapp actually represented certain unnamed electric utilities and electric appliance firms, and demanded that he reveal who they were. The PUC examiner ruled in favor of Knapp's contention that this was not germaine to the issue.

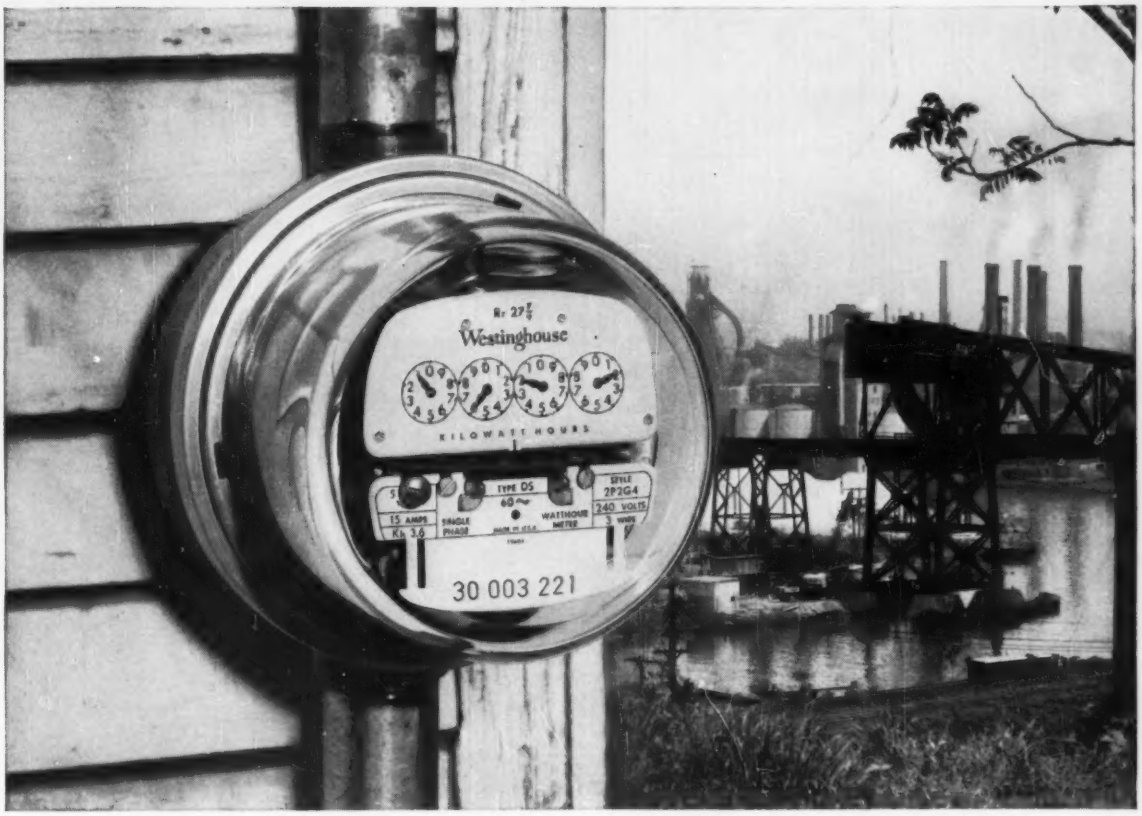
Hearings were on proposed revisions of extension rules and regulations, but most of the builders' testimony related to the so-called "$55 charge" applicable under current rules against each tract house with a built-in electric range.

Gas company spokesmen defended both old and proposed rules (which accomplish the same admittedly incentive objective in a different manner) as being sound economics.

Several of the builders asserted that the charge has made sufficient difference to their profit picture to force them to install gas ranges instead of electric. They contended it unfairly destroys their freedom of choice.

The gas companies do not refer to the $55 as a charge, but rather consider it an "adjustment" of free allowances, made to compensate for future loss of revenue. (The $55 figure is asserted to be an average used in place of complicated individual rate-of-return analyses on each tract house.) It is applied only in tracts—defined as 10 or more houses—where ranges "using fuel other than gas" are installed by the builders. The gas companies contend that built-in electric ranges effectively remove the tract homeowner as a prospect for gas cooking.

Both sides will have the opportunity to file written briefs based on testimony given in this hearing and a previous one held Feb. 17.



FACT: Corrosive atmosphere can't harm *Lifetime* meters

Corrosion can steal years of performance from your watthour meters . . . skyrocket maintenance costs. That's why Westinghouse gave its new Lifetime meters and sockets a corrosion-proof design which defies polluted atmosphere, salt vapor, heat, cold, dirt and moisture.

Aluminum, plastic, lacquer and enamel are used in conjunction with metal parts to help combat corrosion. All metal parts get protective treatments to keep them working smoothly, dependably.

For example, shafts and gears are gold finished. A chemical process is used to create a corrosion-resistant film on aluminum parts. This film actually becomes part of the metal, won't rub off or chip. Result: Westinghouse Lifetime meters run better, longer with less attention. Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-40482

New Lifetime watthour meters

Type DA bottom-connected, type DS socket construction.

YOU CAN BE SURE...IF IT'S Westinghouse

6 PM
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WESTINGHOUSE ELECTRIC CORP. MADE IN U.S.A. TYPE 44 INSTRUMENT CHART
Style No. 172837
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Helping the industry meet its growing loads

Designing instruments to help management make sound decisions

Electric utility managements continually face the urgent question, "How do we improve present system efficiencies and intelligently plan for future capacities?"

To be of true value, their answer to that question must be founded upon accurate, up-to-date information about their own particular operations.

Westinghouse has long anticipated that today's swiftly paced expansion in power systems would accentuate the need for accurate recorded information, a basic foundation in making sound management decisions. Needs of the industry were surveyed, and one timely answer to the kind of instruments desired now appears in the new Westinghouse line of strip chart recorders—the Type 44.

Operational efficiencies and economies are studied by means of the recording voltmeters. Recording varmeters show where the power is being wasted and corrective measures are needed. Recording wattmeters and ammeters give you the information necessary to plan for load growth, proper distribution, and the addition of generating equipment and distribution facilities.

All of these new recording instruments can help you cut costs, develop more reliable operation, make better planning decisions for the future. Indirectly, they will also help you maintain stability and continuity of service, thereby protecting customer good will.

The Type 44 recorder is another example of Westinghouse contributions to electric equipment pioneering. Westinghouse makes a full line of electric measuring instruments for every electric utility requirement—will gladly help you apply them to your instrumentation systems. J-97191

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Greater Accuracy

New, iron-core measuring mechanisms develop twice the torque of previous designs . . . provide faster response, accuracy within 1% under all operating and load conditions.

Ease of Use and Service

All parts are fully accessible from front of recorder, a particular advantage in flush switchboard mounting.

Versatility

Used to make operation and load studies in electric power generating stations, substations, field surveys, and in field service. Also used in industrial applications to check machine performance and factory distribution systems.

Less Mounting Space

Recorder has highest ratio of scale width to panel area, is attractive in appearance and easy to read.

Economy

Less maintenance, long charts last 70 days . . . large ink capacity permits operation for greater unattended periods.

Dependability

Extremely high overload capacity reduces possibility of burnouts. All mechanisms self-shielded against stray magnetic fields.

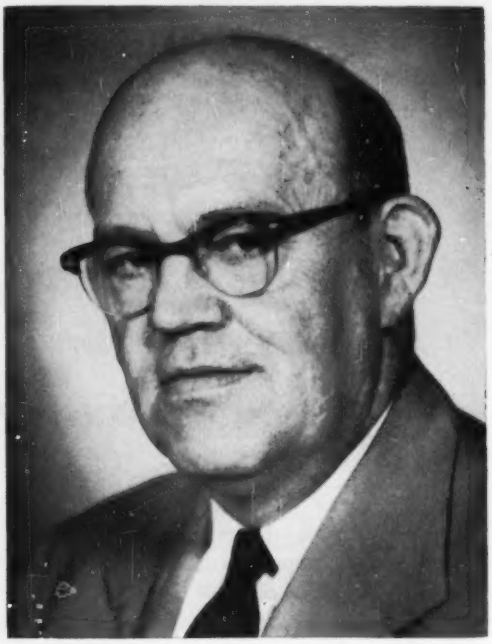
For more information on Type 44 recorders, call your Westinghouse representative or write direct to Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania.

Monnier Elected VP

Charles F. Monnier has been named vice president in charge of operations for Kansas City Power & Light Co. Until June 1 he was vice president in charge of operations of Niagara Mohawk Power Corp.

A native of Attleboro, Mass., he was a 1927 honor graduate in electrical engineering from Worcester, Mass., Polytechnic Institute. He took post-graduate studies in engineering, mathematics, and electronics in General Electric Co staff courses as cadet engineer.

He became a system operator for the New York Power & Light Co. In 1943 he was designated as assistant to the operating and engineering vice president of NYP&L. From 1949 to 1954, Monnier served as division superintendent of electric and gas operations for the Eastern Division of Niagara Mohawk. He was elected vice president of operations for the entire system in 1954.



CHARLES F. MONNIER

WUA Names Leach President

Wisconsin Utilities Association has elected Richard W. Leach president, succeeding Carl J. Forsberg. Leach is vice president and general manager of Wisconsin Natural Gas Co and vice president of Wisconsin Electric Power Co.

He joined the former Milwaukee Electric Railway & Light Co in Racine. He worked in various positions until 1935 when he was transferred to Waukesha as Wisconsin Gas & Electric Co manager. In 1954 he became vice president of the two Wisconsin companies.

S. Lloyd Nemeyer, president of Milwaukee Gas Light Co, has been elected vice president of the association succeeding Leach.

RICHARD W. LEACH

Hartman Made Director of OHI

J. R. Hartman, chairman of Electrical Industry Coordinating Group and vice president of Cincinnati Gas & Electric Co, has been elected to board of directors of Operation Home Improvement.

Hartman was chosen to represent the electrical interests in the industry-wide campaign. The campaign will continue into fiscal year 1957 with "a broadened scope and even greater impact than so far this year," OHI Chairman P. B. Shoemaker has announced.

Hartman has been associated with Cincinnati G&E since 1923. He is presently chairman of sales committee of Ohio Electric Utility and chairman of executive committee of Industrial Electrification Council.

J. R. HARTMAN

relies on Manson Tape for 59 years

Mr. James H. Conkell, Superintendent of the Ridgely Apartments, Birmingham, Ala. says, "In the past 59 years, I have used many brands of tape. I was sure that Manson was the best in 1897 when I first used it, and my long experience using Manson Tape convinced me that it is *still the best today*."

Mr. Conkell first used Manson Friction Tape when he was a lineman for the Postal Telegraph Co. of N. Y. in 1897. He recalls that when Postal re-routed their New York to Philadelphia line, each splicer carried a roll in his tool bag. In 1901, he worked on the rewiring of the Postal Telegraph office in Birmingham, and adds that he used a considerable amount of Manson Tape on that job.

During the past 38 years, Mr. Conkell has used Manson Tape continually in his work as building superintendent and has relied on its unchanging quality to give lasting protection to splices. And he has relied, too, for more than 40 years on his Okonite Tape Distributor, Matthews Electric Supply Company for quick service in maintaining his supply of Manson Tape.

Manson Friction Tape is manufactured from closely woven cotton fabric, frictioned with new, naturally tacky rubber compounded with the best chemical ingredients—all of which assure better adhesion and longer life. Mechanically strong, durable and long-lasting, Manson breaking strength is over 50 lbs. per inch of width, compared with ASTM's requirement of 40 lbs.

Manson assures permanent splices when used with Okonite or Okolite Rubber Tapes. Write for Okonite Splicing Tape Folder EW-1089.

...when you splice with:

AVAILABLE THROUGH AUTHORIZED DISTRIBUTORS ONLY

3968

Made by
THE OKONITE COMPANY
PASSAIC NEW JERSEY
SINCE 1878

SPECIALISTS IN ELECTRICAL WIRES, CABLES AND SPLICING MATERIALS FOR 75 YEARS

Ketchum Made Federal Electric VP

Harold A. Ketchum, formerly vice president and controller of Fasco Industries, Inc, has been elected financial vice president of Federal Pacific Electric Co.

He began his business career as a part time reporter for the Rochester Journal American in 1929 and moved to the staff of the Washington Post for a two year stint beginning in 1935.

In 1937 he became staff assistant to the treasurer of Montgomery Ward & Co in Chicago and served as supervisor in the accounting and merchandising divisions. In 1940 he was employed by Fasco Industries as controller and two years later was elected a vice president.

HAROLD A. KETCHUM

PERSONAL BRIEFS

Ohio Electric Utility Institute has named **Ralph M. Besse,** executive vice president of Cleveland Electric Illuminating Co, as president for a one-year term, succeeding **James M. Stuart,** vice president and associate general manager of Dayton Power & Light Co. **E. S. Fields,** vice president and general manager of Cincinnati Gas & Electric Co, was elected vice president, and **H. C. Vincent,** treasurer of Columbus & Southern Ohio Electric Co, was reelected treasurer. **W. A. Randall,** assistant treasurer, Columbus & Southern Ohio, was elected assistant treasurer and **J. B. Johnson** was re-elected manager-secretary.

Robert E. Schill, manager of Brooklyn Union Gas Co's department of economic research for the past five years, has joined the management staff of Central Vermont Public Service Corp as a special financial assistant to **Albert A. Cree,** president of the utility.

Ebasco Services Inc has appointed **James E. Kearney** manager and **John J. Lynch,** assistant manager of the company's Industrial Engineering Division.

Theodore Braaten, general manager of the City of Norwich Department of Public Utilities, has been elected president of the Connecticut Society of Professional Engineers.

George R. Herbert, executive associate director of Stanford Research Institute, has submitted his resignation and will join the executive staff of American & Foreign Power Co. He will become staff assistant to **Henry B. Sargent,** president of the utility.

During commencement exercises at the University of New Hampshire, Durham, N. H., recently, **Avery R. Schiller,** president of Public Service Co of New Hampshire, was awarded the Charles Holmes Pettee Medal for "personal dedication and activity" demonstrating "confidence in and devotion to the State of New Hampshire."

Leo G. Roemer, treasurer, Wisconsin Public Service Corp and **E. H. Scott,** assistant comptroller, Illinois Power Co, have been elected to membership in the Controllers Institute of America.

OBITUARY

Frank A. Poor, 76, founder and vice chairman of Sylvania Electric Products Inc, died in Wolfeboro, N. H., after a brief illness. He formed Sylvania's first predecessor company in Middleton, Mass., in 1901.

Frederick T. Hepburn, 83, director of Electric Bond & Share Co, died in Locust Valley, Long Island, New York, recently.

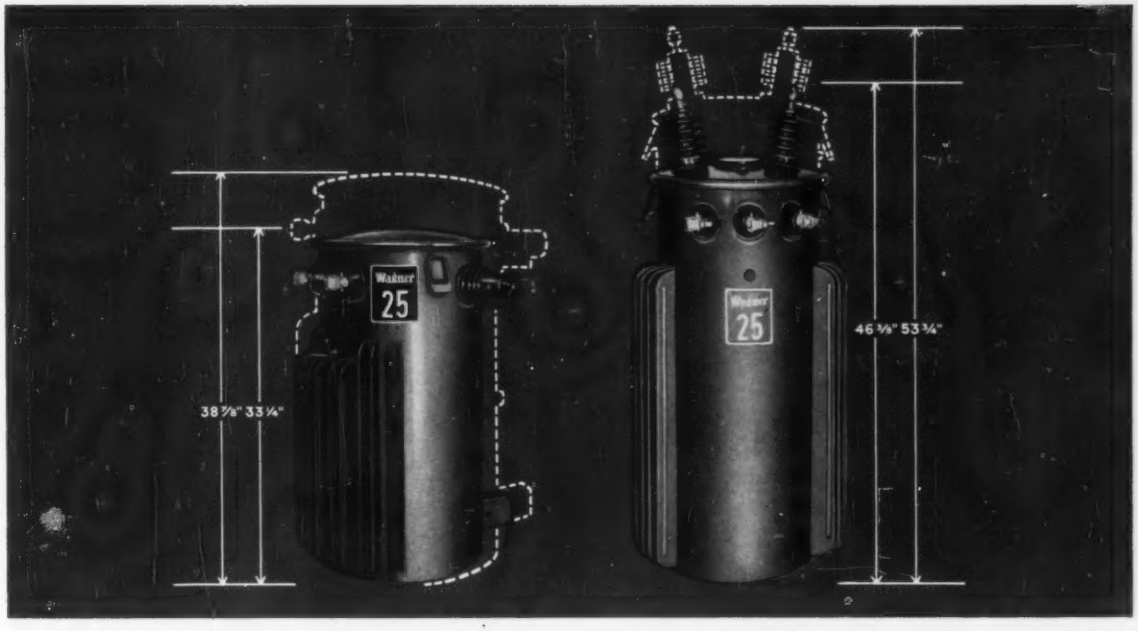
Harry J. Uhlmann, 70, retired Kent, Ohio, district manager of the Ohio Edison Co, died recently.

Ludwig Becomes Controls Co VP

Remy Ludwig has been appointed vice president of the International Division of the Controls Co of America.

He will supervise all administrative duties and management of the company's foreign plants in Cookesville, Ontario, and Nijmegen, Holland, in addition to the development of export sales for both A-P Controls and Soreng Products Divisions.

REMY LUDWIG



WAGNER DISTRIBUTION TRANSFORMERS

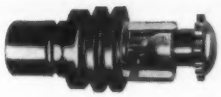
smaller-lighter-easier to handle and install

Now Wagner Form W Distribution Transformers are substantially smaller and lighter than ever before . . . up to 25% shorter in the important overall height dimension—17% lighter in weight. Yet they are liberally designed for excellent electrical performance.

This means greater ease of handling—speedier installation. It also means that you can save money by putting greater transformer capacity on your existing structures . . . handle heavier loads without installing new poles. All these new Form W Transformers, in ratings 15 through 167 Kva, 15 KV and below, can be pole mounted.

Such reductions in size and weight are made possible by improvements in core and coil construction. A special resin coated insulating material is used for layer, channel and barrier insulation. Heat treating bonds this insulation to the coil conductors to give the coils exceptionally high mechanical and electrical strength.

These new, lighter shorter Form W Transformers will meet your distribution requirements. Consult the Wagner Sales Engineer in your area for complete information.



HIGH VOLTAGE SIDEWALL BUSHING

For use with either copper or aluminum conductor . . . safety-designed for faster, easier connections, without tools. Porcelain and terminal are locked in position.

LOCKED LOW VOLTAGE BUSHING

The bushing and terminal are key-locked to prevent rotation . . . on loose terminal connections to cause internal shorts. Suitable for copper or aluminum conductor.

SHUR-SEAL CLAMPING RING

Keeps transformers sealed air-tight . . . no atmospheric moisture or dust particles can get inside.

INHIBITED OIL—reduces oxidation to a minimum . . . retards formation of acids and sludge.

Wagner Electric Corporation

6456 Plymouth Ave., St. Louis 14, Mo., U. S. A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

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ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

MEETINGS CALENDAR

JULY

SOUTHEASTERN ELECTRIC EXCHANGE—Personnel Administration Section, General Oglethorpe Hotel, Savannah, Ga., July 12-13.

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION—Council Meeting, Geneva, Switzerland, July 16-21.

NATIONAL ASSOCIATION OF RAILROAD AND UTILITIES COMMISSIONERS—Annual Convention, Sheraton Palace Hotel, San Francisco, Calif., July 24-27.

COLUMBIA UNIVERSITY INDUSTRIAL & MANAGEMENT ENGINEERING DEPARTMENT—Fifth Annual Utility Management Workshop, Arden House, Harriman, New York, July 29-Aug. 10.

AUGUST

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Heat Transfer Division, First National Conference, Pennsylvania State University, Aug. 11-15.

WESTERN ELECTRIC SHOW AND CONVENTION—Pan Pacific Auditorium and Ambassador Hotel, Los Angeles, California, Aug. 21-24.

SEPTEMBER

NORTHWEST PUBLIC POWER ASSOCIATION, INC—Accounting Section, Cascadian Hotel, Wenatchee, Wash., Sept. 11-14.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—3rd Annual Electrical Conference of the Petroleum Industry, Kansas City, Mo., Sept. 12-14.

EDISON ELECTRIC INSTITUTE—Organization Meeting, sponsored jointly with AGA, Edgewater Beach Hotel, Chicago, Ill., Sept. 13-14; Industrial Relations Round Table Conference, Drake Hotel, Chicago, Ill., Sept. 17-19; Meter & Service Committee, Purdue University, Lafayette, Ind., Sept. 24-26.

PUBLIC UTILITIES ASSOCIATION OF THE VIRGINIAS—38th Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., Sept. 14-15.

ILLUMINATING ENGINEERING SOCIETY—National Technical Conference, Hotel Statler, Boston, Mass., Sept. 17-21.

INSTRUMENT SOCIETY OF AMERICA—11th Annual Instrument-Automation Conference and Exhibt, New York Coliseum, Sept. 17-21.

ATOMIC INDUSTRIAL FORUM, INC—3rd Annual Forum Conference and 2nd Annual Trade Fair, Morrison Hotel and Navy Pier, Chicago, Ill., Sept. 24-28.

PENNSYLVANIA ELECTRIC ASSOCIATION—Annual Meeting, Hotel Wm. Penn, Pittsburgh, Pa., Sept. 25-26.

ELECTRIC COMPANIES PUBLIC INFORMATION PROGRAM—Steering Committee, Blackstone Hotel, Chicago, Ill., Sept. 26; Workshop Conference, Blackstone Hotel, Chicago, Ill., Sept. 26-28.

OCTOBER

EDISON ELECTRIC INSTITUTE—Prime Movers Committee, Radisson Hotel, Minneapolis, Minn., Oct. 1-3; Area Development Committee Meeting, Oct. 3, and Area Development Committee Workshop, Radisson Hotel, Minneapolis, Minn., Oct. 4-5; Electrical Equipment Committee, Hotel Statler, Cleveland, Ohio, Oct. 15-16; Transmission and Distribution Committee, Hotel Statler, Buffalo, N. Y., Oct. 18-19.

ILLINOIS INSTITUTE OF TECHNOLOGY—12th Annual National Electronics Conference, sponsored jointly by AIEE, Institute of Radio Engineers, University of Illinois, and Northwestern University, Hotel Sherman, Chicago, Ill., Oct. 1-3.

NATIONAL ELECTRONICS CONFERENCE—12th Annual Conference and Exhibition, Hotel Sherman, Chicago, Ill., Oct. 1-3.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Fall General Meeting, Morrison Hotel, Chicago, Ill., Oct. 1-5.

CANADIAN ELECTRICAL MANUFACTURERS' ASSOCIATION—12th Annual Meeting, Sheraton Brock Hotel, Niagara Falls, Ontario, Canada, Oct. 3-5.

INDIANA ELECTRICAL ASSOCIATION—Annual Convention, French Lick Springs Hotel, French Lick, Ind., Oct. 3-5.

STANDARDS ENGINEERS SOCIETY—Fifth Annual Meeting, Hotel Willard, Washington, D. C., Oct. 3-5.

SOUTHEASTERN ELECTRIC EXCHANGE—Sales Conference, Tides Hotel & Bath Club, St. Petersburg, Fla., Oct. 3-5.

INTERNATIONAL ASSOCIATION OF ELECTRIC LEAGUES—Sheraton-Cadillac Hotel, Detroit, Mich., Oct. 3-6.

ROCKY MOUNTAIN ELECTRICAL LEAGUE—Annual Fall Convention, Broadmoor Hotel, Colorado Springs, Colo., Oct. 7-10.

INTERSTATE POWER CLUB—Hotel Martinique, New York, New York, Oct. 8.

ILLINOIS INSTITUTE OF TECHNOLOGY—Conference on Computer Applications, Chicago, Ill., Oct. 9-10.

INTER-INDUSTRY FARM ELECTRIC UTILIZATION COUNCIL—National Power Use Workshop, Milwaukee Auditorium, Milwaukee, Wis., Oct. 15-16.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Electrification of Machine Tools Conference, Sheraton-Gibson Hotel, Cincinnati, Ohio, Oct. 22-24.

UNIVERSITY OF TEXAS—Ninth Power Distribution Conference, University Batts Auditorium, Austin, Tex., Oct. 22-24.

AMERICAN STANDARDS ASSOCIATION—38th Annual Meeting and 7th National Conference on Standards, Hotel Roosevelt, New York, Oct. 22-24.

NATIONAL SAFETY COUNCIL—44th National Safety Congress & Exposition, Chicago, Illinois, Oct. 22-26.

NOVEMBER

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION—Annual Meeting, Traymore Hotel, Atlantic City, Nov. 12-16.

EDISON ELECTRIC INSTITUTE—Industrial Relations Committee, EEI Headquarters, New York, N. Y., Nov. 15; Accident Prevention Committee, Statler Hotel, Hartford, Conn., Nov. 26-28.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—22nd National Exposition of Power and Mechanical Engineering, Coliseum, New York, N. Y., Nov. 25-30.

DECEMBER

* **INSTITUTE OF RADIO ENGINEERS**—2nd Instrumentation Conference, Biltmore Hotel, Atlanta, Ga., Dec. 5-7.

* **EDISON ELECTRIC INSTITUTE-AMERICAN GAS ASSOCIATION**—1957 Conference Planning Committee, EEI-AGA Headquarters, New York, N. Y., Dec. 6-7.

* Additions this week.

Battery Additive Cleared

Battery additive AD-X2 has finally been cleared of false advertising charges by the Federal Trade Commission recently, after a three-year dispute that put the issue in and out of the courts and almost cost Bureau of Standards Chief Allen Astin his job back in 1953.

Commerce Secretary Weeks dismissed, then reinstated, Astin during FTC hearings on ad claims by Jess Ritchie and his Pioneer Manufacturing Co that AD-X2 would prolong the life of car batteries. Bureau of Standards had reported adversely on the product.

FTC ruled that while the greater weight of scientific testimony backed Astin, the "overwhelming" weight of consumer testimony backed the ad claims.

VICTOR PROGRESS REPORT #4

We use BLACK LIGHT to certify soundness of VICTOR INSULATORS!

Soundness of insulator porcelain is of utmost importance to every power man. Tiny imperfections, too small for detection by eye alone, can bring about costly failure and interruption of service. VICTOR certifies the soundness of porcelain insulator bodies by the use of "black light." Before firing, insulators are sprayed with a fluorescent material, then subjected to a near ultra-violet light. This process detects the slightest imperfection in the body mass for subsequent rejection. It assures you of sound, perfect insulators, cuts costs, minimizes replacements, safeguards service. Another reason why VICTOR produces the best insulators that money can buy!

"BETTER INSULATORS THROUGH RESEARCH"

SPECIFY VICTOR

Purified Porcelain Insulators!

VICTOR INSULATORS DIVISION
I-T-E CIRCUIT BREAKER CO.
VICTOR, N. Y.

Low and High Voltage Pintypes • Suspensions • Guy Strains
Spools • Switch and Bus Insulators • Custom Designed Porcelain Insulator Hardware

SANGAMO AUTO VAR CAPACITOR EQUIPMENT

low cost
...light weight
...quick and easy to install

Twelve-unit multi-row Auto Var Capacitor Equipment for crossarm mounting. Assembly is light in weight—easy to install on crossarm.

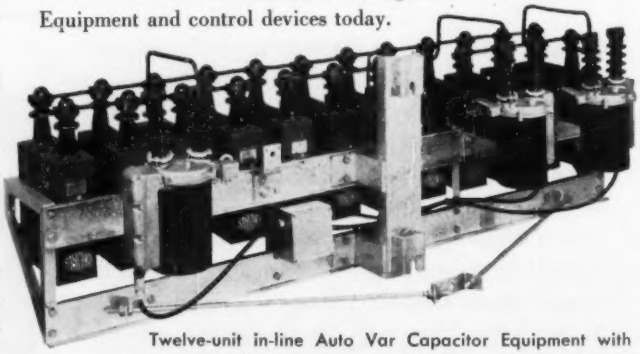
Sangamo Auto Var Equipment is completely assembled for automatic operation. It is wired at the factory. It enables capacitor installation on distribution circuits in amounts approximating peak load kilovars where permanent connection of such capacitors would be disadvantageous at light loads.

Both multi-row design for crossarm mounting, and in-line design for direct-to-pole mounting, are available. Equipment includes hot galvanized steel rack, capacitor units, electrically operated oil switches, junction box and all wiring. Switches can be omitted if desired.

Auto Var Equipment can be supplied in all distribution voltage ratings and with standard Kvar ratings ranging from 225 to 600 Kvar. Choice of either 25 Kvar or 50 Kvar individual capacitors.

Buy Sangamo Time Switches and LincoInIrols for automatic control of Auto Var Equipment as a function of time, volts, amperes, watts or vars.

Write for full information on Sangamo Auto Var Equipment and control devices today.



Twelve-unit in-line Auto Var Capacitor Equipment with electrically operated oil switches. Close coupling to pole gives low bending moment.

SANGAMO Electric Company
SPRINGFIELD, ILLINOIS

PP&L LINEMAN Frank Jacobson, routed from his own home, helps Civilian Defense corpsmen keep wary eyes on dikes

How PP&L Fought a Flood with Water

A Columbia River flood crest drained into the Pacific in mid-June after punching dikes and levees, flooding thousands of acres of land, and again chasing dwellers from homes they flee almost annually.

Pacific Power & Light Co had seen all this before. Annual spring flooding of the swollen Columbia pushes the Williamette out of its banks in Portland and inundates the basement of the main warehouse.

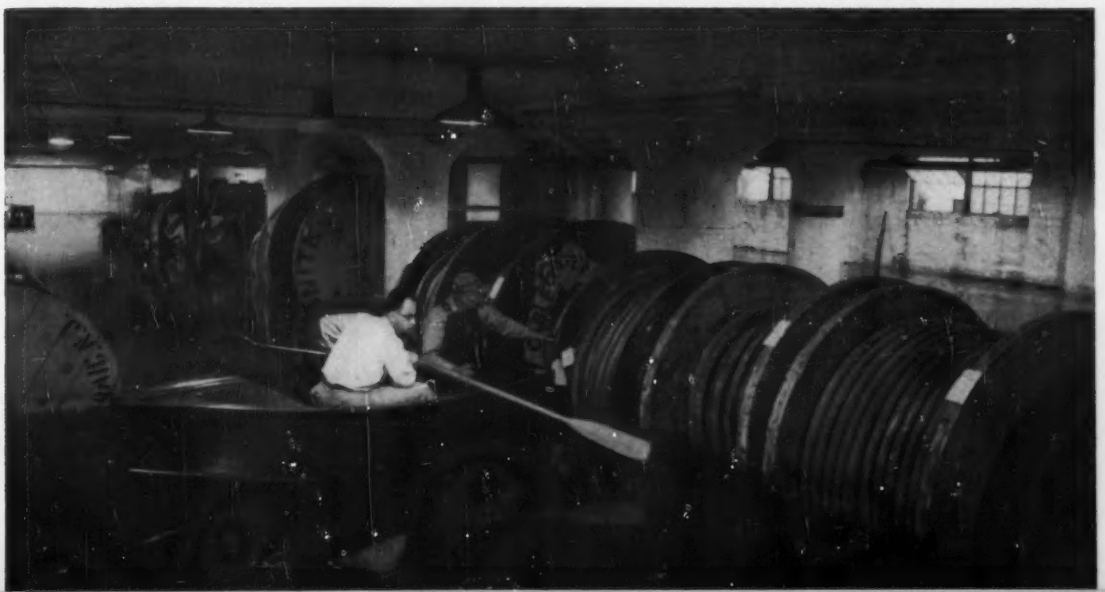
Clean-up crews in previous years had faced this littered basement—slimy with silt which menaced their health. And the company had paid hefty clean-up bills.

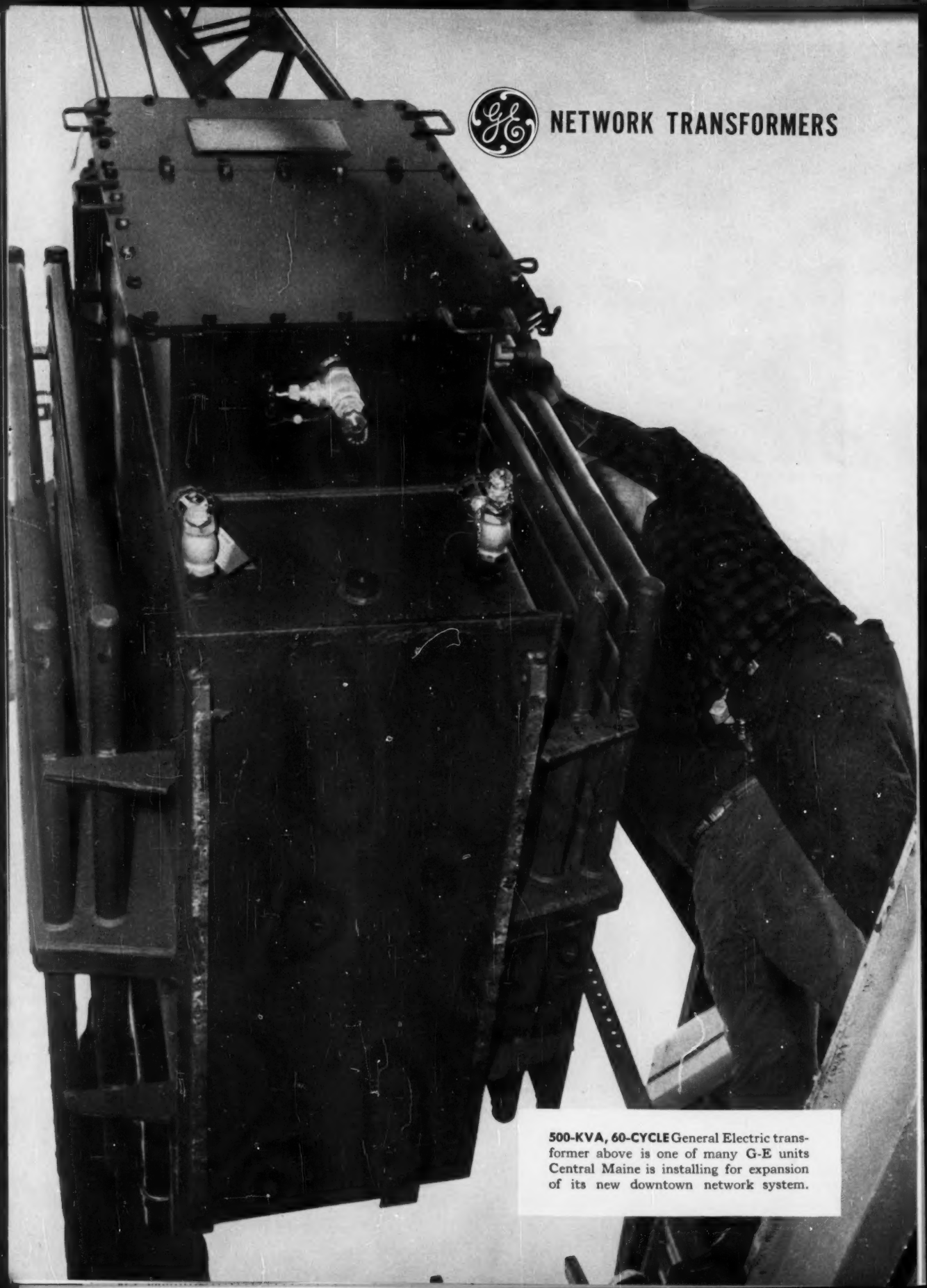
But this year the story was different. PP&L fought the rising crest by flooding its warehouse basement with clean city water. The equalized hydrostatic pressure kept silt from being carried in by flood waters.

Rated the fifth heaviest runoff in history, partly because of clashes with high incoming tides, the spring freshet of snowmelt from the high Rockies and Cascades put flood control efforts to a new test. Electric utilities tossed in emergency crews, PP&L lent walkie-talkies gear to dike patrols, and Portland General Electric Co assigned engineers to pumper duty work.

Bonneville Power Administration lost 800,000 kw because of high tailrace waters, but load had fallen off with the warmer weather. All investor-owned utilities met their loads.

FIGHTING WATER with water, PP&L flooded its warehouse with clean city water to equalize pressure and keep silt out





500-KVA, 60-CYCLE General Electric transformer above is one of many G-E units Central Maine is installing for expansion of its new downtown network system.

Why Central Maine Converted Radial System to a Network

In downtown Portland, Maine, the Central Maine Power Company faced today's familiar problem—how best to meet the growing demand for power.

After careful investigation, Central Maine's forward-looking engineers converted the company's 4-kv radial system to an 11-kv network system, recently adding a number of General Electric transformers to expand the system. In changing to a network, Central Maine gained these advantages:

Improved regulation—Voltage drop with the new system is less than 5% in the network area even under heavy load demands, thus assuring stable voltage for consumers.

Increased dependability—With the network power lines underground, service continuity is further assured. Even though two of the 1955 hurricanes passed through Portland, the network system continued to supply power to doctors, local government offices, and other vital services in the center of town.

Best possible service for customers. With load increasing fast on the old radial system, unscheduled outages, breaker operation, and fuse blowing could have become a source of concern. The new network system helped assure continuity by eliminating the cause of such troubles.

FOR HELP IN PLANNING YOUR SYSTEM

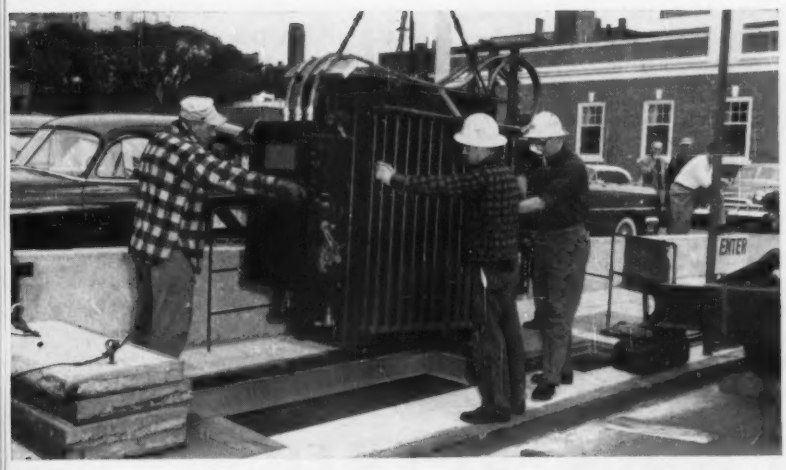
Today's General Electric network transformers are the culmination of more than 30 years' experience in building transformers for network service.

G-E network transformers installed on your system now, allow you to meet increased current demands. When expansion is needed in the future, you have the start for a network system.

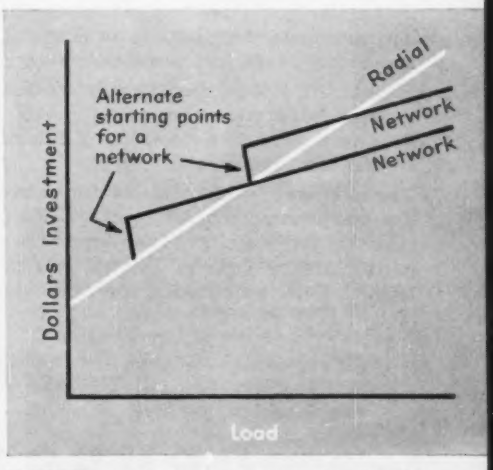
For information on G-E network transformers, and for help in planning your network system, call the nearest G-E Sales Office. Or write for Bulletin GET-2432. General Electric Company, Section 435-12, Schenectady 5, N. Y.

Progress Is Our Most Important Product

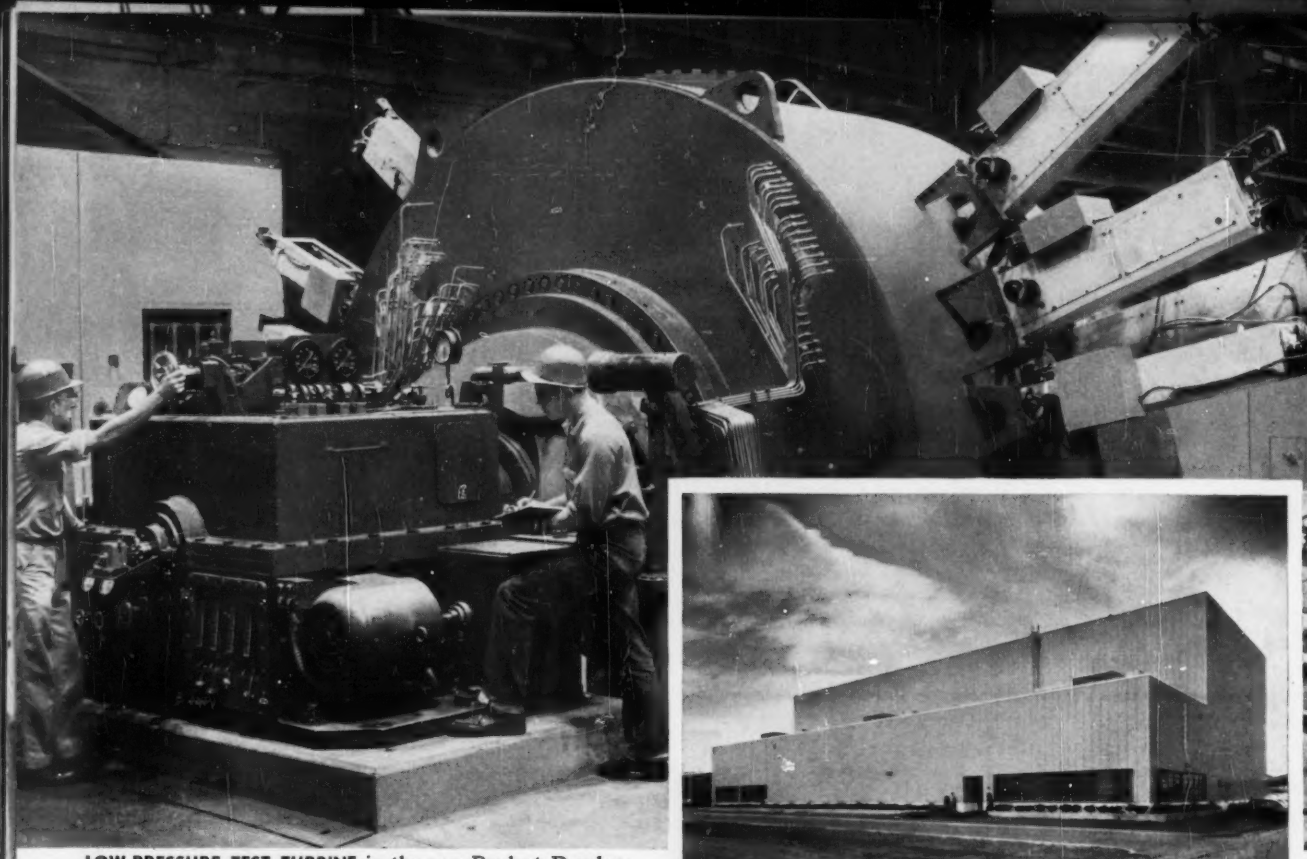
GENERAL ELECTRIC



EASY TO INSTALL, G-E transformers were connected without interrupting service. Central Maine Company men connected cable terminations in their service shop to further simplify installation.



IT COSTS more to increase capacity by changing to a network than by expanding a radial system. But future increases cost less with the network.



LOW-PRESSURE TEST TURBINE in the new Product Development Laboratory (inset) permits full-scale evaluation of latest concepts in steam path design.

New turbine lab facilities ready to tackle the problems of nuclear power generation

The generation of low-pressure, low-temperature steam by nuclear power reactors re-focuses attention on the low-pressure section of steam turbines and the increased importance of efficient use of the energy in this region.

Present G-E low-pressure designs are basically suitable for application in nuclear power plants. Special problems, such as moisture removal to minimize later-stage erosion, need refinement.

The solution to such problems can be evaluated in the Turbine Development Laboratory's new full scale, low-pressure test turbine. The largest 3600-rpm steam parts built by General Electric can be run in this turbine under actual operating conditions.

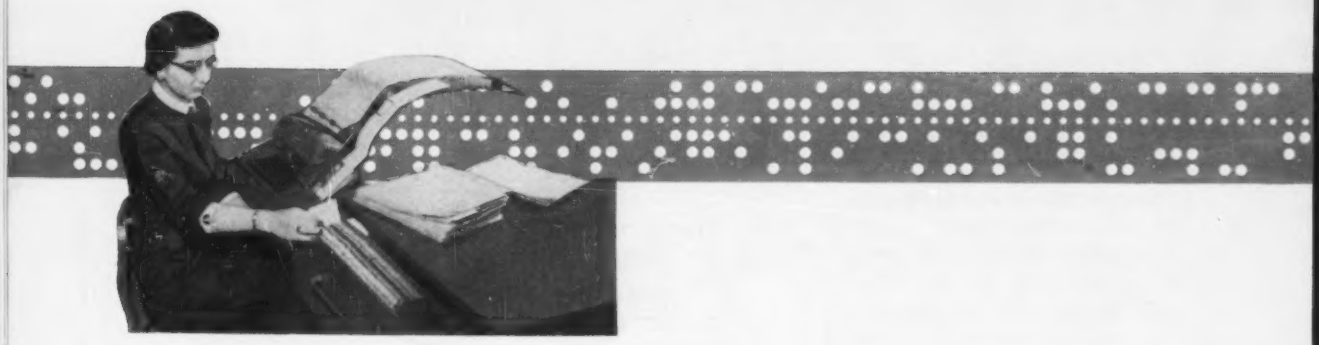
Other special problems such as corrosion of the turbine parts and contamination by radioactive steam are being tackled in General Electric's other complete laboratory and testing facilities. These and many other G-E programs are keeping turbine development abreast of trends in reactor design.

From America's first commercial generation of electricity by nuclear energy (using a G-E turbine)* to working closely with various study groups, General Electric is helping to make atomic-electric power an economic reality in the shortest possible time. General Electric Company, Schenectady 5, N. Y. 254-33

*At West Milton, N. Y., July 18, 1955

Progress Is Our Most Important Product

GENERAL ELECTRIC



Automation Speeds Purchasing

Duquesne purchase orders are now typed automatically at 200 words per minute as the typist sorts papers and prepares to insert quantities and dates. Verification of the information typed automatically is unnecessary.

R. C. WENZ, General Purchasing Agent, Duquesne Light Co., Pittsburgh, Pa.

Purchase orders and inquiries for Duquesne Light Co are now being programmed and typed automatically at the rate of 600 strokes per minute. This operation has become possible by installation of new methods which make use of a Programic Flexowriter in conjunction with continuous forms.

These were the result of nearly a year's study into the Purchasing Department's routine and procedures conducted jointly by the department's personnel and representatives of the various machine and forms companies. Purchase order and inquiry forms were extensively redesigned to make them adaptable to the proposed system. The necessity of exact registration and similarity of arrangement are evident in the new forms illustrated.

Repeat Requisition the Key

The Duquesne method still centers around the repeat requisition (EW May 9, 1955 p48). However, because a great proportion of the information transcribed from the repeat requisition to the purchase order or inquiry is of the repetitive, non-changing type, a method was devised for transferring and typing it automatically.

The typing machine, equipped with both a punch and reader for either punched paper tape or edge punched cards, is used for automatic form control and selection. Constant information appearing on the repeat requisition is coded into one of three data program cards or tapes.

Either paper tape or edge punched cards can be used interchangeably at any time. Duquesne normally uses edge-punched cards for data of a permanent nature and paper tape for information of a temporary or one-shot variety as cards are easier to store. Once this information has been coded or punched into cards and checked, the cards can be used over and over again to type it automatically without reverification. This saving in checking time after original preparation of data program cards is one of the main advantages of this system.

By the use of a master program card, "instructions" are coded into various data program cards which automatically control horizontal and vertical form spacing and select the desired portions of forms to be coded into either composite tapes or select tapes. These tapes are produced at the same time the operator is typing either the purchase order or inquiry forms.

By the use of these "instructions" the typing machine is stopped at predetermined locations to allow the operator to manually type in such non-repetitive data as date, purchase order number, commodity code number, terms, quantity, issue number, price, and discount. Thus only a minimum of information requires any further verification.

Program tapes or cards may be stopped at any time and corrections made. These program cards can also be used to produce additional tapes or cards at any time. By use of a tape-to-card converter the information in a Select Type can be reproduced in ordinary tabulation cards for various future uses.

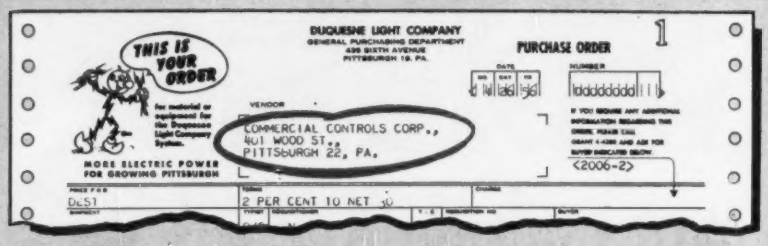
As this procedure is still very unique and new, it is being integrated into the daily routine of the department step by step. This allows for more orderly conversion with the least interruption to daily output of inquiries and purchase orders. Initially, shipping instructions data program cards were prepared for use on all types of Purchase Orders. Shortly thereafter individual Vendors' Data Program Cards were prepared. This not only prepares vendor's information quickly, but also enables Duquesne to maintain up-to-date information on their forms in spite of changing vendor's firm names and addresses due to the "Renaissance" in the Pittsburgh area.

Descriptive Data a By-Product

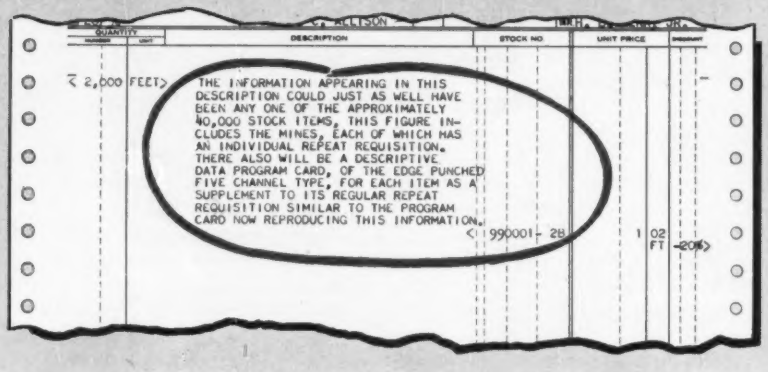
Descriptive Data Program Cards are being prepared as a by-product of typing purchase orders for stock items. When such a Descriptive Data Program Card is prepared, it is noted on the repeat requisition. When the repeat requisition item is up again for order, the Descriptive Data Program Card will be given to the operator along with the repeat requisition from the buyer. Vendor's and Shipping Instructions Data Program Cards are always stored in the operator's possession as they are in constant use.

Multiple copies of each purchase

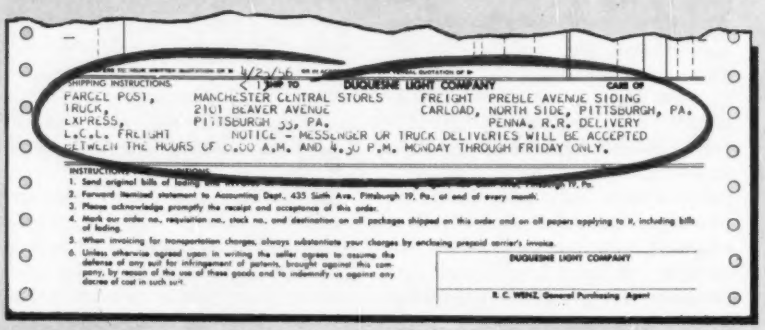
1 The first of three Permanent Data Program Cards, the Vendors' Data Program Card, automatically programs the forms and typing machine. This Data Program Card stops the machine at the proper location for manual typing of data and purchase order number. It automatically types the vendor's name and address and code number (circled) and stops the machine for the manual typing of the commodity code number. The Duquesne Light Company has approximately 4,000 vendors.



2 The second or Descriptive Data Program Card provides for the manual-typing of the quantity information. It then automatically types the items description and stock number (circled) and stops for the manual typing of the issue number, price and discount information. There are approximately 40,000 stock items which will have an individual Description Data Program Card as a supplement to its regular repeat requisition.


QUANTITY
DESCRIPTION
STOCK NO.
UNIT PRICE
2,000 FEET>
THE INFORMATION APPEARING IN THIS DESCRIPTION COULD JUST AS WELL HAVE BEEN ANY ONE OF THE APPROXIMATELY 40,000 STOCK ITEMS, THIS FIGURE INCLUDES THE MINES, EACH OF WHICH HAS AN INDIVIDUAL REPEAT REQUISITION. THERE ALSO WILL BE A DESCRIPTIVE DATA PROGRAM CARD, OF THE EDGE PUNCHED FIVE CHANNEL TYPE, FOR EACH ITEM AS A SUPPLEMENT TO ITS REGULAR REPEAT REQUISITION SIMILAR TO THE PROGRAM CARD NOW REPRODUCING THIS INFORMATION.
<1 990001- 28
1 02
FT <2016>

3 The third or Shipping Instructions Data Program Card automatically types the complete shipping instructions (circled). There are different instructions for each of the 18 normal receiving locations.


SHIPPING INSTRUCTIONS:
PARCEL POST,
TRUCK,
EXPRESS,
L.C.L. FREIGHT
<1 TO
DUQUESNE LIGHT COMPANY
CARE OF
MANCHESTER CENTRAL STORES
2101 BEAVER AVENUE
PITTSBURGH 33, PA.
FREIGHT PREBLE AVENUE SIDING
CARLOAD, NORTH SIDE, PITTSBURGH, PA.
PENNA. R.R. DELIVERY
NOTICE - MESSENGER OR TRUCK DELIVERIES WILL BE ACCEPTED
BETWEEN THE HOURS OF 8:00 A.M. AND 4:30 P.M. MONDAY THROUGH FRIDAY ONLY.
INSTRUCTIONS
1. Send original bills of lading
2. Forward itemized statement to Accounting Dept., 435 Sixth Ave., Pittsburgh 19, Pa., at end of every month.
3. Please acknowledge promptly the receipt and acceptance of this order.
4. Mark our order no., requisition no., stock no., and destination on all packages shipped on this order and on all papers applying to it, including bills of lading.
5. When invoicing for transportation charges, always substantiate your charges by enclosing prepaid carrier's invoice.
6. Unless otherwise agreed upon in writing the seller agrees to assume the defense of any suit for infringement of patents, brought against this company, by reason of the use of these goods and to indemnify us against any decree of cost in such suit.
DUQUESNE LIGHT COMPANY
R. C. WENZ, General Purchasing Agent

order and inquiry are prepared simultaneously. Uncarbonized areas block out specific information from appropriate individual copies.

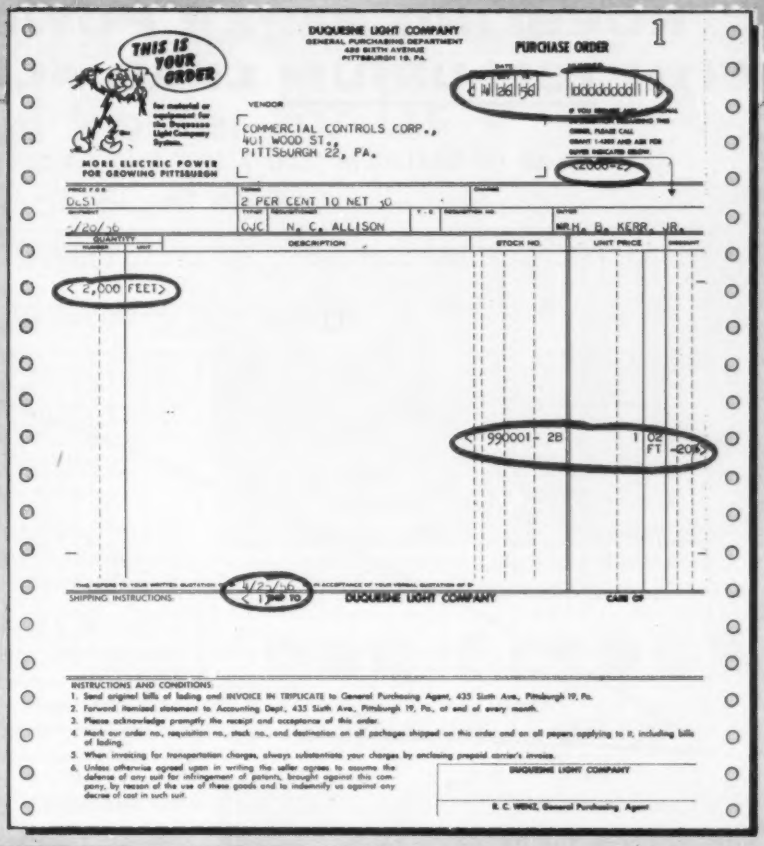
Inquiries and Purchase Orders for charge direct items (non-stock items) will be handled in a slightly different manner. These normally involve long descriptions and detailed specifications which normally had to be typed and verified both for the inquiry and the purchase order. But a Composite Tape can be produced as a by-product of typing the inquiry. It will be stored with the recapitulation of bids until such time as the purchase order is written. It then can be used to automatically type the purchase order, with any corrections or editing inserted, thus eliminating another detailed verification.

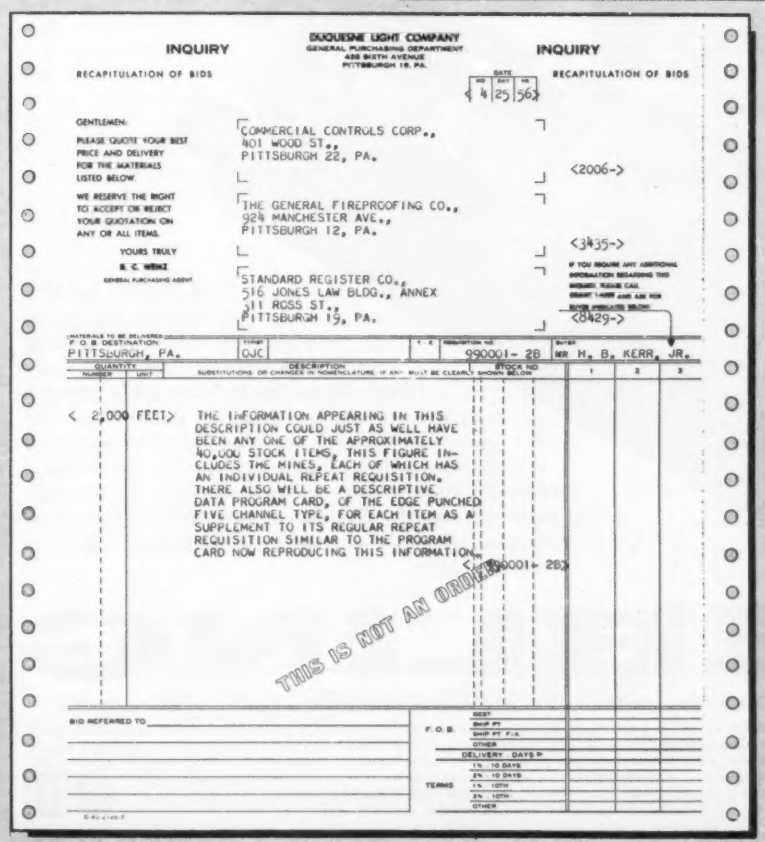
A similar machine may be used in the future to type the initial purchase requisition for charge-direct items and produce a by-product tape at the same time to be used later to type automatically the major portion of the inquiry and the purchase order.

Information coded into the Select Tape as a by-product of purchase order writing will soon permit using a tape-to-card converter to automatically produce tabulating cards. From these a variety of information can be obtained, including commitments of the company by commodity number and by vendor, basic information needs for "accounts payable," and possibly for inventory control.

4 All the information and data that is manually typed is shown here. On purchase orders for stock items the operator obtains this information from the repeat requisition.

As a by-product of preparing the purchase order form the information circled is punched into a Select Tape. (The stock number and the shipping instruction code, also shown, are automatically typed.) By use of a tape-to-card converter, standard tabulating cards can be produced for various purposes.


DUQUESNE LIGHT COMPANY
GENERAL PURCHASING DEPARTMENT
435 SIXTH AVENUE
PITTSBURGH 19, PA.
PURCHASE ORDER
1
THIS IS YOUR ORDER
MORE ELECTRIC POWER FOR GROWING PITTSBURGH
VENDOR
COMMERCIAL CONTROLS CORP.,
401 WOOD ST.,
PITTSBURGH 22, PA.
<2000->
DcS1
2 PER CENT 10 NET 30
4/20/56
OJC
N. C. ALLISON
MR. H. B. KERR, JR.
QUANTITY
DESCRIPTION
STOCK NO.
UNIT PRICE
<2,000 FEET>
<990001- 28
1 02
FT -20%>
SHIPPING INSTRUCTIONS:
4/25/56
<1 SHIP TO
DUQUESNE LIGHT COMPANY
INSTRUCTIONS AND CONDITIONS
1. Send original bills of lading and INVOICE IN TRIPLICATE to General Purchasing Agent, 435 Sixth Ave., Pittsburgh 19, Pa.
2. Forward itemized statement to Accounting Dept., 435 Sixth Ave., Pittsburgh 19, Pa., at end of every month.
3. Please acknowledge promptly the receipt and acceptance of this order.
4. Mark our order no., requisition no., stock no., and destination on all packages shipped on this order and on all papers applying to it, including bills of lading.
5. When invoicing for transportation charges, always substantiate your charges by enclosing prepaid carrier's invoice.
6. Unless otherwise agreed upon in writing the seller agrees to assume the defense of any suit for infringement of patents, brought against this company, by reason of the use of these goods and to indemnify us against any decree of cost in such suit.
DUQUESNE LIGHT COMPANY
R. C. WENZ, General Purchasing Agent


INQUIRY
RECAPITULATION OF BIDS
DUQUESNE LIGHT COMPANY
GENERAL PURCHASING DEPARTMENT
435 SIXTH AVENUE
PITTSBURGH 19, PA.
INQUIRY
RECAPITULATION OF BIDS
DATE
<4 25 56>
GENTLEMEN:
PLEASE QUOTE YOUR BEST PRICE AND DELIVERY FOR THE MATERIALS LISTED BELOW.
WE RESERVE THE RIGHT TO ACCEPT OR REJECT YOUR QUOTATION ON ANY OR ALL ITEMS.
YOURS TRULY
R. C. WENZ
GENERAL PURCHASING AGENT
COMMERCIAL CONTROLS CORP.,
401 WOOD ST.,
PITTSBURGH 22, PA.
<2006->
THE GENERAL FIREPROOFING CO.,
924 MANCHESTER AVE.,
PITTSBURGH 12, PA.
<3435->
STANDARD REGISTER CO.,
516 JONES LAW BLDG., ANNEX
311 ROSS ST.,
PITTSBURGH 19, PA.
<8429->
IF YOU REQUIRE ANY ADDITIONAL INFORMATION REGARDING THIS INQUIRY, PLEASE CALL GRANT 1-4000 AND ASK FOR BUYER INDICATED BELOW.
MATERIALS TO BE DELIVERED F.O.B. DESTINATION
PITTSBURGH, PA.
OJC
990001- 28
MR. H. B. KERR, JR.
QUANTITY
NUMBER
UNIT
DESCRIPTION
SUBSTITUTIONS OR CHANGES IN NOMENCLATURE IF ANY MUST BE CLEARLY SHOWN BELOW
STOCK NO
1
2
3
< 2,000 FEET>
THE INFORMATION APPEARING IN THIS DESCRIPTION COULD JUST AS WELL HAVE BEEN ANY ONE OF THE APPROXIMATELY 40,000 STOCK ITEMS. THIS FIGURE INCLUDES THE MINES, EACH OF WHICH HAS AN INDIVIDUAL REPEAT REQUISITION. THERE ALSO WILL BE A DESCRIPTIVE DATA PROGRAM CARD, OF THE EDGE PUNCHED FIVE CHANNEL TYPE, FOR EACH ITEM AS A SUPPLEMENT TO ITS REGULAR REPEAT REQUISITION SIMILAR TO THE PROGRAM CARD NOW REPRODUCING THIS INFORMATION.
<990001- 28>
THIS IS NOT AN ORDER
BID REFERRED TO
F.O.B.
DEST
SHIP PT
SHIP PT F/A
OTHER
DELIVERY DAYS P
TERMS
1% 10 DAYS
2% 10 DAYS
1% 10TH
2% 10TH
OTHER

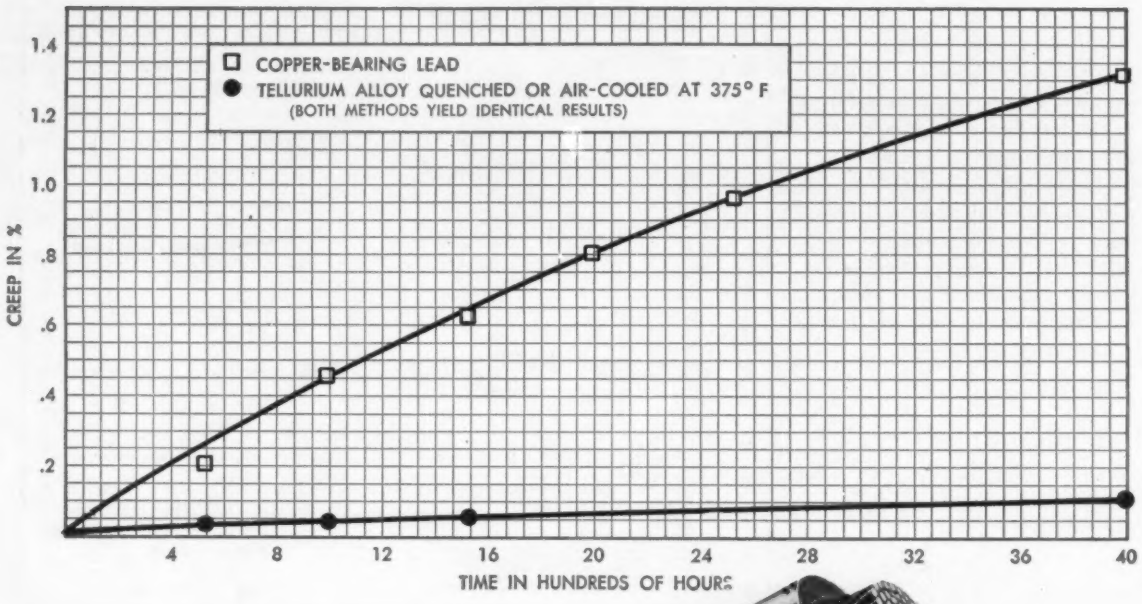
5 Inquiries for as many as three vendors are prepared simultaneously. Uncarbonized areas block out vendor information on appropriate copies, yet all appear on the Recapitulation of Bids copy.

The same Vendors' Data Program Cards and Description Data Program Cards used to type the purchase order are also used to type the inquiry.

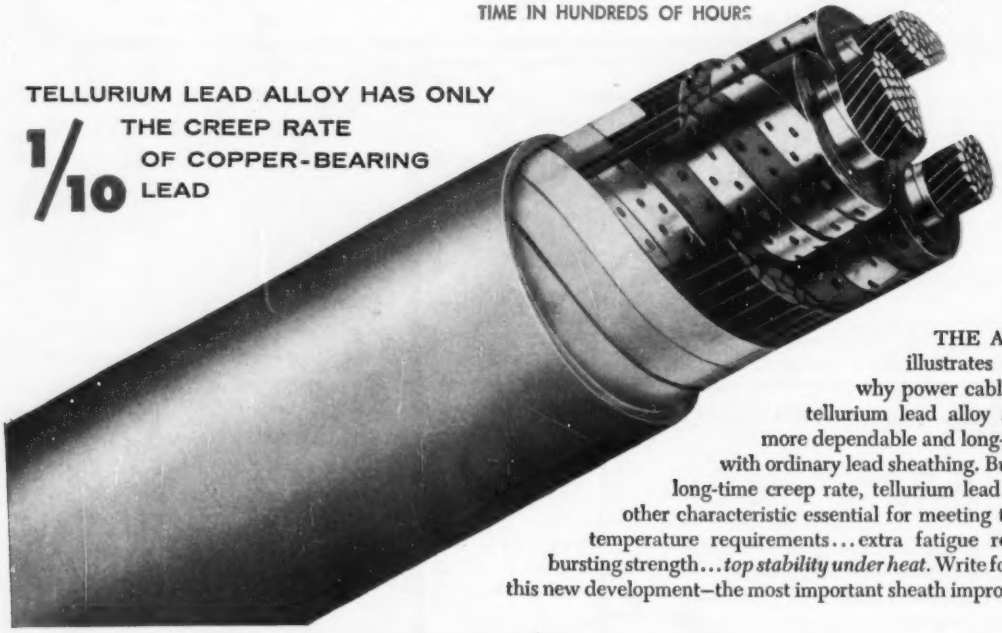
Manually typed information for stock items is obtained from the repeat requisition.

ROEBLING PAPER POWER CABLE WITH TELLURIUM LEAD ALLOY SHEATH

CREEP OF TELLURIUM LEAD ALLOY AND OF COPPER-BEARING LEAD AT 200 PSI - 150° F



TELLURIUM LEAD ALLOY HAS ONLY **1/10** THE CREEP RATE OF COPPER-BEARING LEAD



THE ABOVE GRAPH illustrates one big reason why power cable with Roebling tellurium lead alloy sheath is vastly more dependable and long-lived than cable with ordinary lead sheathing. But besides its low long-time creep rate, tellurium lead alloy has every other characteristic essential for meeting today's load and temperature requirements... extra fatigue resistance... high bursting strength... *top stability under heat.* Write for full facts about this new development—the most important sheath improvement in years.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

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At the polls, the people of Ogdensburg, N.Y., said . . .

"No Municipal Power for Us"

Niagara Mohawk Power Corp fought an uphill but victorious battle, laying success to the following:

- **A door-to-door campaign by employees**
- **A lusty Citizens Committee**
- **Support of organized labor**
- **A special movie shown in theaters**
- **A last-minute advertising campaign**

Despite seemingly overwhelming opposition, Niagara Mohawk Power Corp has won its fight in Ogdensburg, N. Y., and will continue supplying the community with electric power.

On June 19, Ogdensburg voted 2,694 to 1,730 to sink the proposal that the city buy Niagara Mohawk's facilities there and set up its own municipal system. Of those voting, 61% were against the proposal and 39% were for a bond issue to finance the purchase.

This victory did not come easy for Niagara Mohawk. The company attributes its success to its vigorous campaign described here. This triumph is significant in the running fight with public power advocates. It is particularly significant because:

- Ogdensburg is on the St. Lawrence River within a few miles of the generating plants of the St. Lawrence Power Development now under construction. The Power Authority of the State of New York promised Ogdensburg 35,000 kw if it set up a municipal distribution system.
- For more than 30 years, the people of Ogdensburg and the area had been told that the St. Lawrence development would mean "cheap" power—that it would create a new era of prosperity. Public power advocates went all out to capitalize on this "golden opportunity."
- The campaign for municipal power was vigorously championed by the mayor, city administration, the chamber of commerce, and the owners of the city papers and the radio station.
- This formidable opposition was offset in large part by the activity of the company's employees, a strong and able Citizens Committee, and the support of organized labor.

At the start it seemed that "everyone" was for municipal power, but the final vote decisively proved that the underlying sentiment was against government in the power business. The public discussion and debate extending over six months revealed these significant reasons:

1. "Dependable service" had more appeal than any other consideration.

2. People were convinced that Niagara Mohawk employees had experience and training that could not be matched by municipal employees.

3. People were extremely distrustful of a politically managed operation.

4. They were opposed to more debt and taxes.

Fourth row, left to right—Robert J. Murray, Gary F. Hurley, George H. Cudwell, Frederick E. LaPlante, Augustus W. Walter, James P. Burr. Third row, left to right—Roy F. Nichols, Joseph G. Goodyer, Jack E. Downing, Arthur J. Stivers, Kenneth B. Wiggins, Lawrence H. Serth, Vernon G. LeClair, Charles A. Avener and Robert J. Ellis. Second, left to right—Jack P. Blair, Bruce A. Autrey, Joyce E. Hallett, Margaret K. Lapine, Patricia A. Wood and Frederick E. Crossford. First row, left to right—John B. McCabe, William J. Seymour, Edmund I. Buckley, Alfred A. Gamelin, Ronald M. Perron and Arthur V. Brown.

OUR PLEDGE

to the people of Ogdensburg

Standing, left to right—Earl W. Sellers, Charles E. Hollis, William V. Pregmon, Leland T. Thompson, Theodore N. LaVenture, William C. Shea, C. David Schermerhorn, John R. Stoffel, George W. O'Neil and Charles F. Rollman. Seated, left to right—Robert A. Lamond, Ralph C. Scoble, Alfred J. Lehman, Paul D. Morley, James W. Forester and Nigar J. Gagnon. One employee, Albert Cousino, was absent when the picture was taken due to confinement in the A. Barton Hepburn Hospital.

WE are the people who work for Niagara Mohawk in Ogdensburg. Some of us have been on the job more than 25 years . . . and our average service with the power company is 17 years. Most everyone in town will recognize a friend or neighbor in these pictures of us.

We're proud of the job we do, proud of our training and experience and proud of the electric service we and our company provide you in Ogdensburg.

We ask you to vote "No" on June 19th. We pledge to continue giving you our best efforts, to do our utmost to assure you of dependable, low-cost service—the kind of service a politically managed operation could never deliver in Ogdensburg. So we ask you to keep us and Niagara Mohawk electric service on the job in Ogdensburg.

Vote "NO" June 19th!

LOCAL 836 I.B.E.W. (AFL-CIO)

THIS ADVERTISEMENT PAID FOR BY LOCAL 836 INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS (AFL-CIO) ON BEHALF OF ALL NIAGARA MOHAWK EMPLOYEES IN OGDENSBURG. HERMAN TEVELING, PRESIDENT LOCAL 836

IN ADS LIKE THIS, the union emphasized experience of its men and pledged continuing good service as in the past

Story Continues on page 63

Color Speeds Obsolescence

Survey finds pasteled refrigerators bring sales far ahead of old model's life span; other purchases follow

When Mrs. Shopper spies the yellow, pink and green refrigerators glowing on her appliance dealer's floor, or in advertisements, here's what is apt to happen according to a recent Hotpoint Co survey:

The housewife, somewhat rebellious about being surrounded by a kitchen of white, says: "I spend so much time in the kitchen I've decided a new colored refrigerator is what I need to make it more attractive." She knows that yellow model would blend with her redecorating plans. The fact that her refrigerator at home is only about 11 years old doesn't deter her. And, partly because none of her friends own colored appliances, Mrs. S's desire for "something new" is not to be denied.

Wants More Appliances

She has the new model installed. Her friends, sometimes with reluctant husbands in tow, come to admire and to make some mental budget estimates. And Mrs. S, highly pleased with her purchase, begins to feel a craving for more of the same. There's a 39% chance she'll have the whole kitchen remodeled, or, if not that at least another pasteled product, cabinets, or sinks and counter tops.

The chain of events above, adapted from Hotpoint's survey of 256 owners of colored refrigerators—both its own and competitive models—lends the company's refrigeration department's Marketing manager, Howard J. Scaife, to say: "It is my belief that color, properly sold and merchandised to the public, will play the major role in accelerating obsolescence which will enable us to significantly reduce the trade-in span from 11 years to perhaps seven or even lower."

30% Color by 1960

Scaife predicts that about 200,000 colored refrigerators will be sold this year. He expects this figure to rise 3 to 5% until in 1960 the industry's colored refrigerator sales will reach 30 to 35% of total refrigerator volume.

In Hotpoint's survey, 79% of the owners' refrigerators were not worn out prior to the purchase of color model. And 28% of these said it was less than five years old, 37% had models under 10 years old.

"This points up the fact," said Scaife, "that color refrigerators and, more broadly all electric appliances, can decidedly create additional as well as multiple sales for dealers."

As for the old model—39% said they sold it, 38% kept it, 16% traded it in and 7% junked it. The appliance dealer, according to the survey, is far and away the No. 1 outlet for a color appliance prospect. Seventy-two percent went to the retail appliance store for rainbow hues. Contractors were a low second with 8%.

On the motivation angle: 83% said their friends hadn't recommended the buy, 17% indicated the neighbors had colored appliances, and only 2% said they were influenced by suggestions of friends. Almost 83% offered these reasons for first considering the purchase of a colored refrigerator: Planned a colorful kitchen; wanted a change from white; remodeled kitchen and just saw colored model and liked it.

Color preferences are yellow, pink, green, brown and blue, in that order. And the fastest moving appliances are refrigerators, ranges and dishwashers, also in that order.

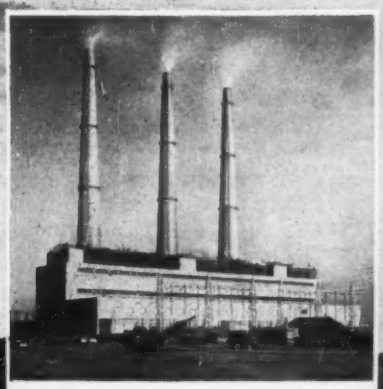
Price No Obstacle

Analysis of the survey showed most prospective buyers (74%) had predetermined the color they wanted. This suggests dealers would do well to carry at least the five preferred hues as well as one different appliance in each different color. Seventy-five percent said their color choice was picked to match or blend with the kitchen's color scheme. Only 3% cited price as a factor which shows Scaife says, "They are in the market for a colored appliance, have pre-determined what color they want and the reason why they want it, and are willing to pay the recommended price for the appliance."

(*More S & S on page* 55)

'Outdoor' LBE Exhibit Tops Dallas Show

Visitors to Dallas' recent home show saw how to Live Better . . . Electrically via this Dallas Power & Light Co exhibit, described as the best in the show. Appliances of most major manufacturers were included in the display.



KYGER CREEK PLANT, at Cheshire, O., with a capacity of 1,075,000 kilowatts, is the world's second largest investor-owned power plant.

CLIFTY CREEK PLANT, at Madison, Ind., with a capacity of 1,290,000 kilowatts, is the world's largest investor-owned power plant.

THE MIRACLE ON THE OHIO RIVER

On the banks of the Ohio, right now, these two huge electric plants are turning out power at the rate of over 18-billion kilowatt-hours annually. They are, respectively, the first and second largest investor-owned power plants in the world. They stand on what was farmland less than three and one-half years ago.

Their completion, substantially ahead of schedule, is the result of the outstanding teamwork of management, investors, engineers, technicians and workers in privately-owned utilities and their suppliers.

The vast power output of these plants, *almost half as much electricity as all France produces,* is ready to assure uninterrupted operation of the Atomic Energy Commission's uranium diffusion center near Portsmouth, Ohio.

When the AEC made its enormous needs known, 15 private electric companies* joined forces to form the Ohio Valley Electric Corporation and its subsidiary, Indiana-Kentucky Electric Corporation. In quick order the 11 gigantic B&W boilers, the turbines, generators, buildings—and all the vast complex of auxiliary equipment—were designed, built and placed into operation.

The first generating units went "on the line" in February 1955. The final unit was put in service in February 1956 at Clifty Creek, marking the largest installation of power in a single project ever made in a 12-month period.

All Americans can be proud of OVEC-IKEC for this great accomplishment. What appears to be a miracle is, in reality, a clear demonstration of what private enterprise and enlightened government, working together, can accomplish for the benefit of the entire nation.

The future will undoubtedly pose many similar challenges. Can they be met? Babcock & Wilcox, like so many other American firms, is pledging its resources in extensive manpower and engineering development programs to guarantee that the answer will be "Yes!"

The Babcock & Wilcox Company, 161 East 42nd Street, New York 17, N. Y.

***SPONSORING COMPANIES OF OVEC-IKEC**

Appalachian Electric Power Company* • The Cincinnati Gas & Electric Company
Columbus and Southern Ohio Electric Company • The Dayton Power and Light Company
Indiana & Michigan Electric Company* • Kentucky Utilities Company
Louisville Gas and Electric Company • Monongahela Power Company** • Ohio Edison Company
Ohio Power Company* • Pennsylvania Power Company*** • The Potomac Edison Company**
Southern Indiana Gas and Electric Company • The Toledo Edison Company • West Penn Power Company**

*Subsidiary of American Gas and Electric Co. **Subsidiary of The West Penn Electric Co. ***Subsidiary of Ohio Edison Co.

BABCOCK & WILCOX
BOILER DIVISION

N-210

DEAD END WITH

BLACKBURN

W6-2A from 6 Sol to 2 ACSR
This Clamp Will Handle All
Popular Service Drop Wires

WEDGE CLAMPS

For Light Service
W6-4A
6 Sol to 4 ACSR

For Heavy Service
W2-OA
2 Sol to 1/0 ACSR

Conductor in contact with wedge for entire length of slider.

Removable aluminum slider allows installation without threading through clamp.

Drop wire can be pre-sagged and cut to exact length needed.

Can be attached to bare neutral at any point in the span.

Your Choice of 3 Bails

STANDARD FLEXIBLE CAPTURED FLEXIBLE FREE

JASPER BLACKBURN CORPORATION 35 MADISON STREET • ST. LOUIS • MAIN 1-2821

Restaurateur Offers Tips On How to Sell His Breed

When restaurant men from all over the country began calling Vick Clesi, prominent Dallas restaurateur, for information on his four electric places it made him think ". . . that not all local power companies have been as aggressive as Dallas Power & Light Co in educating restaurant men in the advantages of modern electrified food service."

Clesi, a surprise speaker at Hotpoint Co's fifth Utility Commercial Cooking Clinic in Chicago, offered the 115 sales executives in attendance these five tips: **1.** More utility promotion and showroom display of modern equipment; **2.** wiring concessions; **3.** more specialized installation techniques; **4.** a more competitive rate structure for commercial cooking; and **5.** around-the-clock product service.

Norris-Thermador Corp photo

Students' All-Electric Home

"We learn by doing," most educators and all self-made men are fond of saying. The 20-student building construction class at Pasadena City College makes their case in point with a recently completed all-electric campus home which Rose Queen Joan Culver and Pasadena President William Langsdorf admire above. With products donated by manufacturers, and the counsel of trade unions and a local building association, the students apply class room techniques in their first year, then act as foremen and superintendents in the second. The class meets four hours a day, three hours on the job and one in technical study.

S & S SHORTS

Shopping for Price Grows

Discount selling now accounts for one-third of all appliance sales, shows survey made by Selling Research, Inc. Organization queried 1,500 housewives in 55 cities, found most discount buying is concentrated on major appliances—air conditioners, ranges, refrigerators, dishwashers, floor polishers. Television and washing machines, however, are not as popular as cut-price items. Appliance stores accounted for 38% of all purchases, both discount and list; department stores, 30%; discount houses, 13%.

Outsells Electric Dryers

Gas clothes dryers outsold electric units in Illinois last year, reports American Home Laundry Manufacturers' Association. Illinois residents bought 53,390 gas dryers as against 41,207 electric. Electricity made its strongest showing in states of Washington, New York, Ohio and Texas where electric dryer sales were well ahead of the competition.

All-Electric Caravan Pulls 10,000

More than 10,000 architects, builders, and realtors across the country thus far have seen the 1956 All-Electric Home Caravan (EW, Dec 12, 1955 p 144) says General Electric Co.

Food Radiation Seen Hypo for Refrigerator Sales

Freezer sales could suffer but refrigerator sales conceivably could double if a new food radiation process, described last month, reaches commercial development.

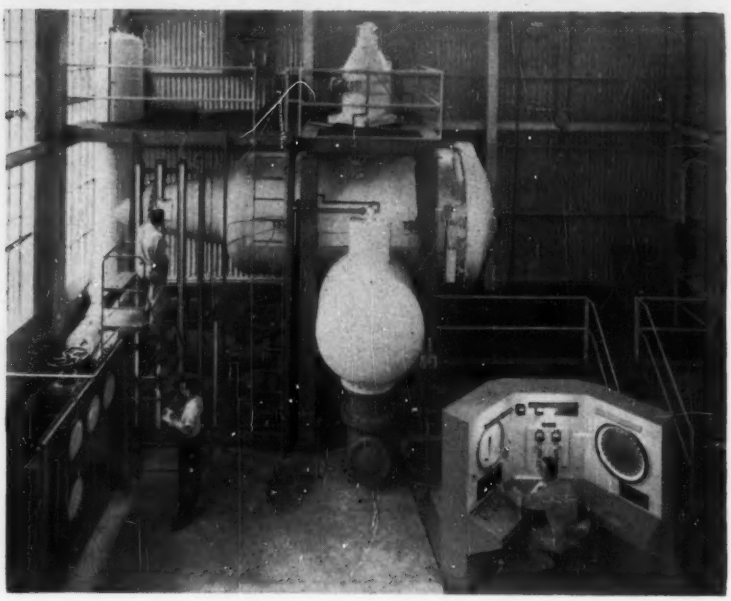
L. E. Brownell, University of Michigan, told American Society of Refrigerating Engineers' annual meeting of a process in which high gamma radiation is combined with refrigeration to increase storage life of cooked meats, blanched vegetables and other foods packed in plastic bags.

"Commercial development of the process probably would greatly increase use of refrigeration both in commercial handling of food and storage in the home," he said. "Housewives might use an additional refrigerator solely for storage of foods kept for two or three months or longer. Foods could be stored at 40F, cheaper than at home freezer temperatures, and the thawing waiting period would be eliminated."

Cost estimates indicate that a large-sized plant could irradiate foods for about 1¢ per lb, a cost considered to be commercially feasible, he declared.

Home Fixture Month Set; Is Gaining Industry Help

A campaign has started to organize cooperation of 2,000 distributors and 300 electric utilities for an American Home Lighting Fixture Month this October. The drive, backed by American Home Lighting Institute, aims for the start of ". . . the greatest sales year the residential lighting fixture industry has yet seen," said Ted Cox, AHLI's managing director.



S. Morgan Smith High-Head Turbine Lab Indicates . . .

Field Tests May Be Passé

A high-head turbine laboratory is the latest addition to S. Morgan Smith Co's testing facilities at its York, Pa., plant. Capable of simulating up to 300-ft heads, the laboratory tests scale-model units for design improvement data and preliminary checks before construction of large hydro-turbines.

One important result of the laboratory's testing, an engineering spokesman of the 79-year-old company pointed out, is that a 12-in. prototype which tests for, say, 93% efficiency will perform at that efficiency or higher in its full-sized counterpart. According to the engineer, users of homologous units can seriously consider foregoing costly, time-consuming field tests when a unit's model meets contractual requirements in lab tests.

"The new . . . laboratory is another step forward towards improved designs of hydrodynamic machinery," said President Beauchamp E. Smith, grandson of the company's founder. "Now that we can duplicate field conditions, many of the problems that have confounded us in the past may be thoroughly explored under controlled procedures."

The main problem to which President Smith refers is development of turbine runners with improved cavitation characteristics. Visual methods of testing, he said, leave something to be desired because it is difficult to obtain definite cavitation break-off points with visual aids. This and other limitations brought about the high-head test stand idea to develop runners meeting modern requirements of higher speeds, smaller diameters and reasonable settings for any given head. The test stand, designed by the company, has repeatable accuracy of plus or minus 0.25%, Smith said, and absolute accuracy considering the accurate calibration within 1%.

One 300-hp, 0 to 6,000-rpm eddy current dynamometer is used to measure turbine horsepower. Load is applied at a 21-in. radius to a calibrated Emery cell and reads directly in pounds load on the gage board. Revolutions per minute are measured by a mechanical tachometer, pulley-driven from shaft and an electronic speed counter using a magnetic pickup and a 60-tooth sprocket on main shaft. The dynamometer also measures down thrust on an Emery cell by hanging all rotating components on the cell.

In testing, two pumps, rated 9,500 gpm and operating in series or parallel, discharge water into a header, then through either of two Venturi meters to a Venturi header-collector from which air is allowed to escape when starting the test stand. Water flows from header to 7-ft diam head tank, then through the turbine to discharge tank. Here pressure can be altered to change sigma during tests. A 100-ton water cooling system maintains the 10,000-gal stand capacity at constant temperature.

Other S. Morgan Smith research equipment consists of two low-level test stands—open flume and pressurized system—a horizontal impulse stand, and pump-turbine stand. The company has tested prototypes for some of the largest turbine equipment in use in the U. S., including turbines for Chief Joseph Dam (100,000 hp, 165-ft net head, 100 rpm) and runners for McNary Dam (111,300 hp, 80-ft head, 85.7 rpm).

Programs for the high-head stand include development of Francis runner, wicket gate and stay vane models for Idaho Power Co's Brownlee Development, the first Hells Canyon plant (four 144,000-hp units, 250-ft head, 128.6 rpm), and model studies for Ice Harbor Dam's Kaplan units (143,000 hp, 89-ft head, 90 rpm).

Utilities Directory Has Data on 3,890 Systems

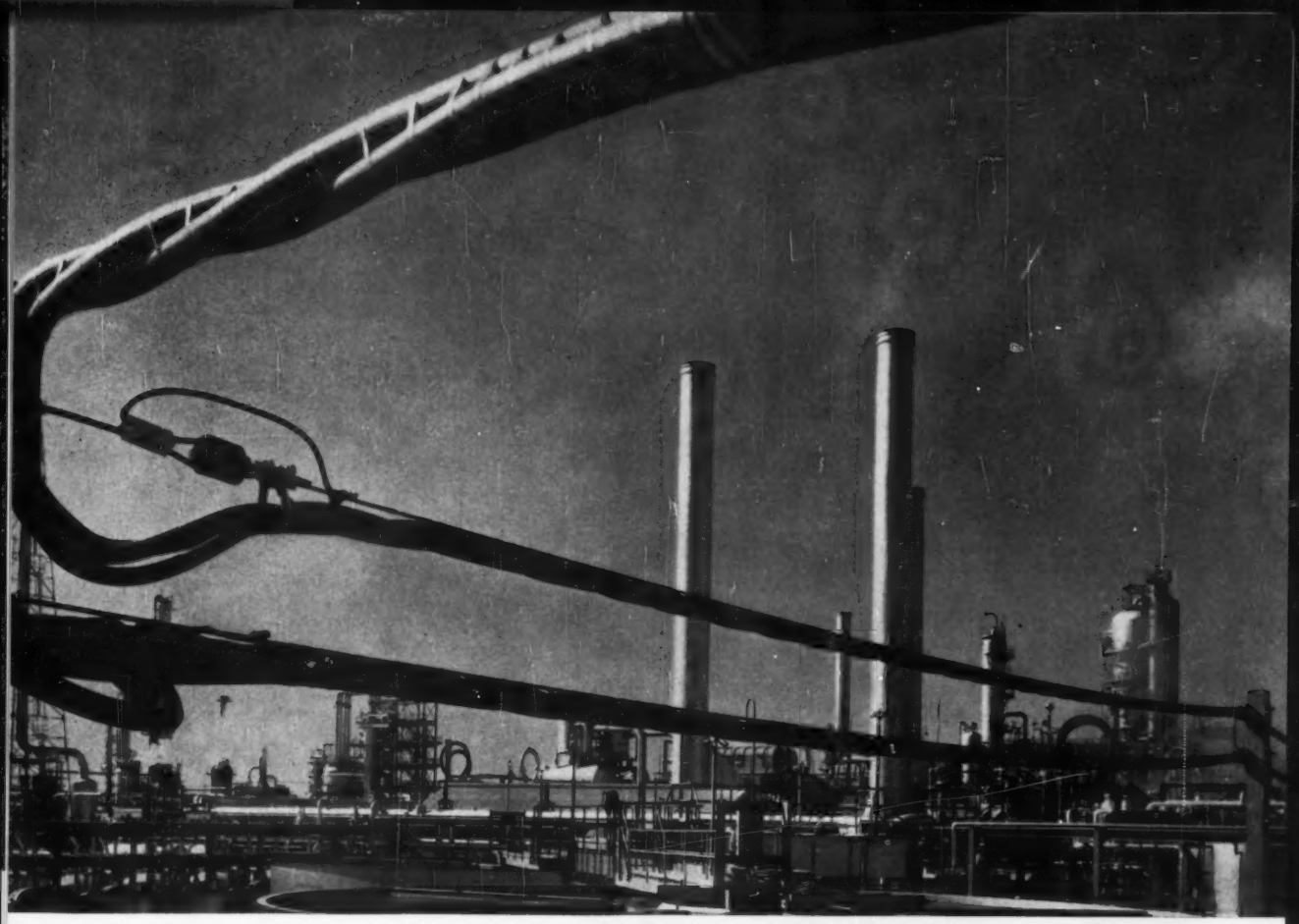
The industry's basic reference on power suppliers and their personnel and systems will be distributed this week. It is the 65th edition of the McGraw-Hill Directory of Electric Utilities.

Its 849 pages carry information about 3,332 systems in the United States, 32 in U. S. possessions, and 526 in Canada, or 3,890 total. Public power agencies and cooperatives are listed as well as investor-owned companies.

In addition to top executives, personnel listings include purchasing agents and plant superintendents of all these suppliers—over 15,000 names correct as of April 1.

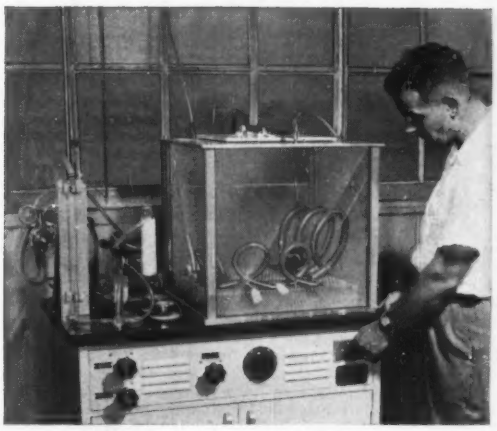
Data on 3,500 power plants are given. Physical characteristics of the

(*Continued on page* 59)



Anaconda 15 kv aerial cable installed at oil refinery.

New high-voltage cable cracks the ozone barrier



SAMPLES of Type AB insulated cable bent in small circles are placed in ozone chamber for ozone-resistance test.

Butyl insulation in Anaconda Cable exceeds ozone-resistance test requirements by 2400%

Under high electric stress, minute particles of air break down, form corona. This generates ozone which may combine with the rubber hydrocarbon of the insulation. Without superior ozone resistance, the insulation fails.

But now you can get extra protection against ozone—and ozone damage—with Anaconda Type AB butyl-insulated cable. This insulation is compounded for *inherent* ozone resistance along with other desirable properties.

In standard ozone-chamber test, Type AB insulation (after aging) shows no injury after 72 hours in 0.025-0.030% ozone concentration . . . 24 times longer than required by oil base and butyl specifications.

New Engineering Bulletin EB-27 gives full details on performance of Type AB insulation in 15 Industry Specification Tests. See the Man from Anaconda or write: Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y. 84297

SEE THE MAN FROM ANACONDA®

pioneer in BUTYL INSULATION

"Pressure-creosoted telephone poles mean an actual budget reduction!"

Mr. Travis with one of the 98,362 pressure-creosoted poles now giving such good service on the lines of the United Telephone Company of Iowa.

reports
United Telephone Company of Iowa, Newton, Iowa

"Our telephone system is 81.8% pressure-creosoted," reports Mr. Lawrence E. Travis, Vice President and General Manager, "and within 10 years will be 100% creosoted. Because of the excellent characteristics of the pressure-creosoted poles, we have even changed our original estimate of 35 years to a longevity span of 40 for the poles, and we have been able to reduce our budget for 1956.

"The following table shows the value we place on our pressure-creosoted poles: From 1951 to 1955 we spent—

1951	$109,291	for pressure-creosoted poles
1952	99,643	
1953	98,466	
1954	106,962	
1955	105,213	
1956	73,326	

"The main reason for the reduction lies in the longevity of the pressure-creosoted poles. We can afford to taper off due to this life span, and the poles we buy from now on will be primarily for system extension and change-over to heavy class pole."

Heavy wire loads, high winds, ice burden, severe ground strain and stress, freezing winter cold and boiling summer heat have no effect on the pressure-creosoted poles of the United Telephone Company of Iowa. Mr. Travis continues, "We find the pressure-creosoted poles 100% neutral to weather, bugs and water. We used to core test every two years but have discontinued the practice because of the uniformity of performance of the poles. The poles, even those in the ground since 1936, are as good as they were then . . . and the butt ends are in excellent shape."

If you would like more information on pressure-creosoted utility poles, and the way they can enable you to save money and establish better service for your utility, just get in touch with the nearest Chemical Sales office of United States Steel or write to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

USS CREOSOTE

SALES OFFICES IN PITTSBURGH, NEW YORK, CHICAGO, CLEVELAND, SALT LAKE CITY AND FAIRFIELD, ALA.

UNITED STATES STEEL

(*Continued from page 56*)

systems, such as total capacity, steam and hydro capacities; transmission, distribution, and service voltages; dc distribution voltages; and number of customers are supplied.

Other information includes the power supplier for towns over 500 in population, membership of all regulatory commissions, and headquarters address and managing director of national and state associations.

The book, which is thumb indexed, sells for $30. A 10% discount is given on five or more copies. Purchasers are entitled to buy separate state sections at a reduced price. Orders should be sent to McGraw-Hill Publishing Co., 330 West 42nd Street, New York 36, N. Y.

Aluminum Plastic Cable to be Made in Canada

New plant of Western Wire & Cable Co, Weyburn, Sask., 40 miles above North Dakota's border, has obtained Canadian rights for production of an aluminum plastic cable using a recently developed German process.

J. E. Terruende of Vancouver, B.C., president of the firm, said Western Wire would begin immediate production of the cable in addition to producing plastic pipe for the oil industry. Use of the process, originated by a Dusseldorf wire and cable manufacturing company, would sharply reduce weight and costs, he said, since there is no need for lead sheathing.

Markets for the cable as well as the pipe are anticipated in western Canada and in U. S. plains states.

Turbine Output's Booming Soviet Report Claims

The Soviet Union's turbine industry, pushing to meet an 83% power production hike ordered in the latest Five Year Plan (EW, April 2, p 76), recently reported these developments:

- At the Leningrad Stalin (sic) Works, production has begun on hydro turbines with between 200 and 300-Mw capacities, two to three times more than a 120-Mw unit which it calls the world's largest.
- Put into service a 200-Mw steam turbine with 1,900-psi steam pressure at a steam temperature of 1,000 F.
- Began work on another 200-Mw unit (3,200 psi and 1,100 F), and a 300-Mw turbine with 4,400 psi and 1,200 F. (Biggest in the U. S. are American Gas & Electric Co's two 450-Mw units being built by General Electric Co which will have 3,500 psi and 1,050 F.)
- Produced a 12-Mw gas turbine, described it as a new branch of their turbine industry.

The report claimed that 1955 output of steam turbines exceeded 1950 totals by 70%, most of the increase being in big hydro units.

As ordered in the Five Year Plan, power production by 1960 must reach 320-billion kwhr annually. (Estimates for U. S. output in 1960 is about 767-billion kwhr.)

U. S. Aluminum Production

Primary aluminum production in U. S. in May amounted to 150,800 tons, and was a record on a monthly basis, according to the Aluminum Association, New York. This was an increase of 6,074 tons over the April production and 19,672 tons over May, 1955, production. Total for this year through May was 714,577 tons, compared to 632,234 tons for the same period in 1955.

Federal Pacific Aim: $50 Million Sales

A Golden Anniversary sales goal of $50 million is slightly ahead of schedule for Federal Pacific Electric Co, Robert C. Graves, sales vice president, told New York security analysts late last month. This compares with $18.4 million gross sales in the last half of 1955 and a $7.4 million volume for the year 1946.

In his outline of the firm's "breakout" from the narrow confines of solely low-voltage equipment production, Graves said they now look to servicing industry, such as original equipment manufacturers, for future advances. In this "over-all market of one-half-billion dollars, a 1% advance means five-million sales dollars," he said.

FPE's distribution and control equipment production, Graves stated, has already realized a high percentage of its total potential with builders and utilities, "the solid underpinning of our business." Its Scranton (Pa.) plant's output of switchgear and bus duct has "plummeted Federal Pacific squarely into the industrial arena."

At some of its nine other plants, which includes Thornton Street Plant in Newark, N. J., production has been geared to hit the firm's present target in fields of equipment manufacturers and of plant maintenance and renovation. Last year FPE passed the 1-million sq ft mark for manufacturing area.

One big factor in the company's growth, Graves said, was the introduction of Stab-lok, its household circuit breaker, in 1950. Today the estimated residential market for the device is $5 billion. FPE has been recovering the device's development investment two to three times a year, he declared.

M & M BRIEFS

American Standards Association, 70 E. 45th St, New York 17, N. Y., has published a booklet with index and prices of 1,600 American Standards.

U. S. Testing Co, Hoboken, N. J., has formed a reliability evaluation department to supply government and commercial electronics industry with design and performance data needed for higher reliability components. Its aim: Reduce reliance on arbitrary judgment with meaningful and reproducible information. Senior Engineer W. Smith is department head.

Hanson-Van Winkle-Munning Co announced a new process for bright nickel plating that is said to give high leveling characteristics. The Matawan, N. J., firm calls the process Levelume.

Union Carbide Nuclear Co plans a multi-million dollar expansion of uranium production facilities near Rifle, Colo., which is expected to greatly increase output. A processing mill and two ore-receiving stations and chemical upgrading plants will be built by the company, a division of Union Carbide & Carbon Corp. Construction is set to begin soon and completion date is Fall of 1957.

BUSINESS OUTLOOK

Electrical World
JULY 2, 1956

Business determination to persevere with expansion plans remains the most solid support to present business levels. The new report of the Securities and Exchange Commission and the Commerce Department, supports the findings of the recent McGraw-Hill survey of capital spending. The government report estimates business capital spending during the first three quarters of this year as 26% higher than during the same period in 1955. The McGraw-Hill survey estimated business capital spending up 30% for the year as a whole. In view of differences in definition and coverage these estimates are reasonably well in line.

• • •

Rechecking with individual firms shows that with a few exceptions, businesses are sticking to their expansion plans, despite the present slowdown and a third quarter drop in demand which they themselves anticipate. They realize that the economy is still in a growth phase, and that they stand to face serious loss from inadequate or obsolete capacity if they call off expansion plans every time there's a temporary drop in sales. There's even some feeling that jittery reactions are unconstructive as well as unreasonable, since if too many businesses bet on a decline they'll be bound to get it.

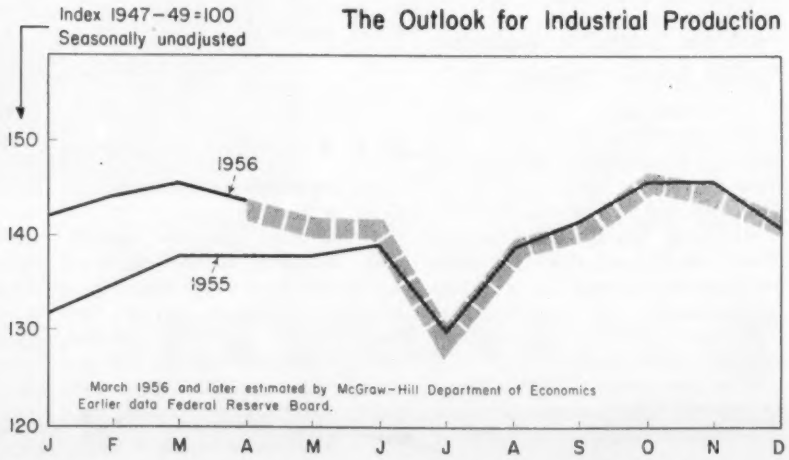
• • •

Employment trends remain encouraging so far. May's employment figure at 65.2 million involved no decline from the previous month and was up by a remarkable 2.5 million from a year earlier. Unemployment, at 2.6 million hasn't risen yet either, and is still pretty close to a minimum "full employment" level. Overall unemployment has been remarkably little affected by the decline of 400,000 in factory jobs. The slowdown in manufacturing has shown up, though, in a decline from 41 to 40 hours in the average factory work-week from the first of the year, and by a virtual freeze on the size of the average weekly paycheck. With the normal seasonal rise in the labor force this summer, there's bound to be some more unemployment, if the expected greater-than-seasonal decline in industrial activity materializes.

• • •

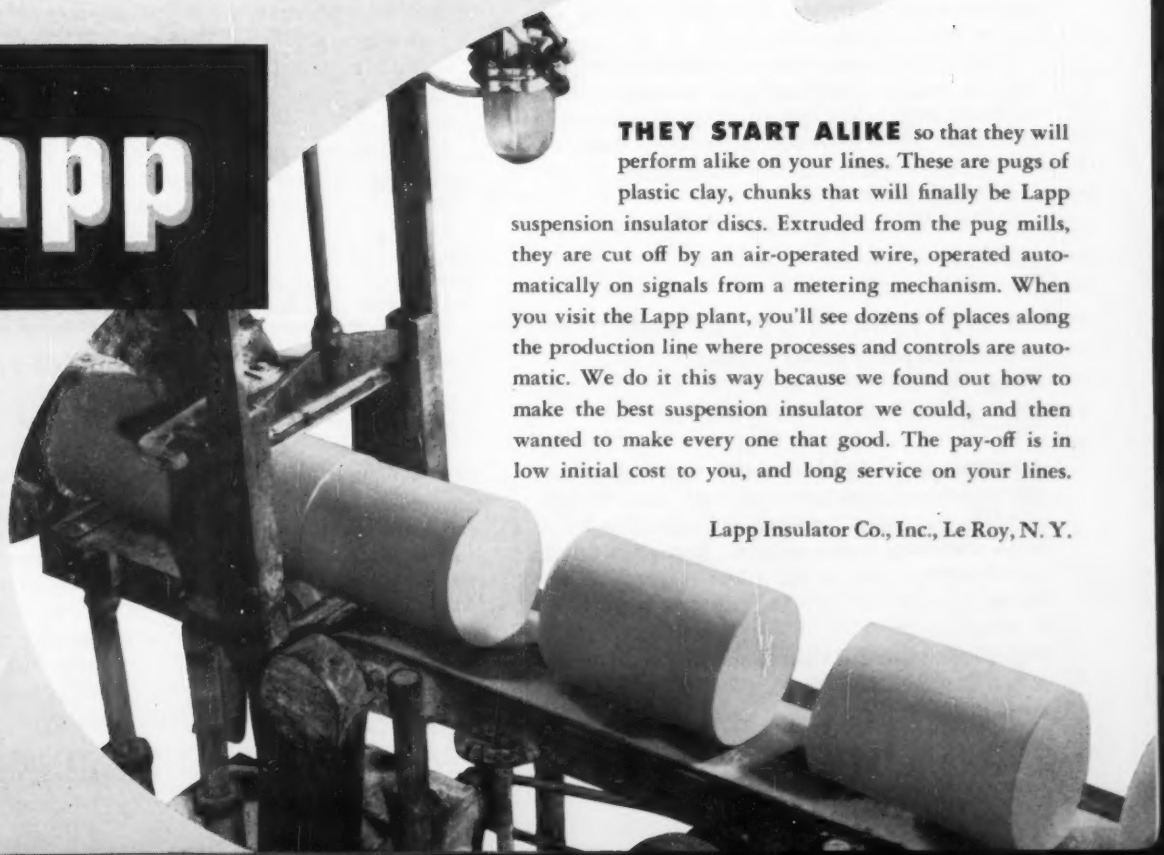
There's already some slight indication that easier money policies may not be enough to check a rising unemployment trend this summer. The Federal Reserve System has been supplying more funds to help banks make loans to businesses requiring cash for June tax payments. But businesses have not been breaking down any bank doors to get the additional funds: business loans remain slightly below what they were a month earlier.

The Outlook for Industrial Production



LONG LIFE OF YOUR TRANSMISSION LINES depends on insulator characteristics—and *uniformity* of those characteristics. The experience of millions of Lapp suspension units in service proves the soundness of Lapp design. Automation and control in Lapp manufacture guarantee their uniformity—and their low cost to you, in terms of mechanical strength, electrical permanence, and extra margin of operating security.

Lapp



THEY START ALIKE so that they will perform alike on your lines. These are pugs of plastic clay, chunks that will finally be Lapp suspension insulator discs. Extruded from the pug mills, they are cut off by an air-operated wire, operated automatically on signals from a metering mechanism. When you visit the Lapp plant, you'll see dozens of places along the production line where processes and controls are automatic. We do it this way because we found out how to make the best suspension insulator we could, and then wanted to make every one that good. The pay-off is in low initial cost to you, and long service on your lines.

Lapp Insulator Co., Inc., Le Roy, N. Y.

Sell Electric Living First

"Live Better . . . Electrically" spokesman gives some tips that may help utilities line up trade allies in all-out promotion drive

Is Live Better . . . Electrically a "Johnny Come Lately?"

It would seem so in view of some points made by a spokesman for LBE, itself, this month at the National Association of Electrical Distributors.

The whole concept of an industrywide market development program may be new to the electrical camp, declared R. E. Boian, LBE project manager, but it's old hat in many another industry. Our tardiness probably has cost us untold millions of dollars in business. Said Boian:

"Each toaster that goes into a kitchen today . . . (has) defeated not only competitive brands, but with most families the toaster has won a battle over a new chair, new shoes, or a new dress.

"We must face this type of competition—industry versus industry—every day in millions of homes.

"Other industries have recognized this indirect competition years before we did. They have moved to develop industrywide markets for the products they offer—to tell the consumer that their products make a basic contribution to health, enjoyment, or convenience. By doing so, they pave the way for promotion of individual lines—they expand the market for the whole industry.

"There's the meat industry advertising to point out why more food dollars should be spent on meat.

"There's the carpet industry telling the housewife that 'home means more with carpet on the floor.'

"There's the coffee industry talking about the joys of the coffee break.

"There's the beer industry telling the family that its product belongs in the home. Its latest ad is number 117 in a series.

"We've all seen the promotion of the gas industry. For years their trade organizations have told a basic story of the 'alleged' advantages of their fuel. Even their individual manufacturer's ads devote space to the gas story.

"While our prospects have been exposed to these industrywide promotions that tell a basic story of benefits and make a strong pitch for more customer dollars, what have we in the electrical industry been doing?"

Boian's answer: "We've advertised our own brands. We've sold the gadgets on our equipment without first selling the basic contribution to better living our products offer—without first selling the basic need that exists for all our products."

Admittedly Boian's points are directed mainly toward the manufacturer and those in his distribution channels. Utilities individually have promoted a broad concept of electrical living for some time. But not until now have they had the vehicle for nationwide penetration that LBE offers.

However, this vehicle will roll only if the utility succeeds in getting all its trade allies aboard. Boian's approach speaks a language that distributors, contractors, and dealers will understand. Utilities would do well to use it in lining up their help. As many a salesman has found, a thing is easy to sell if you can show the prospect that he's losing money without it.

TECHNICAL NOTES

Replacement power during overhaul of a major generating unit can run to $9,000 per day. Total can reach 20% of steam station maintenance cost.

Aluminum alloys and hard-drawn aluminum joined with a new soft solder develop joint shear strength of 5,000 psi. Solder is spread with glass-fibre brush to tin aluminum heated to 250C, then surfaces are placed together and molten solder shaped with the brush.

High compression and supercharging have cut diesel-engine fuel requirements to about 8,500 Btu per kwhr.

Safe grounding of conductors on a pine pole without guys can be accomplished by connecting conductors to ground at several remote points to a pole band installed below the space on the pole where work is to be done.

A nuclear reactor in continuous operation draws 6% of its power from radioactive disintegration processes started sometime earlier.

Welded aluminum structures cut engineering, fabrication, and maintenance costs of field-assembled substations. Light weight enables line truck to hoist entire sections after assembly on the ground.

The People of Ogdensburg Voted "No" . . .

(Continued from page 51)

5. "Cheap" public power had relatively little appeal for many people. They quickly figured out that the difference in cost, if any, would be slight.

6. Niagara Mohawk scotched the claim of new industry by proving that with most industries, electric rates are a relatively minor factor. Exposing this fallacy won over a number of civic leaders who had been disposed toward public power.

At the start, not a single voice, other than the company's was publicly raised against municipal power. By the time of the referendum, a lusty Citizens Committee, local unions, and scores of individuals were working furiously in the company's behalf. In the final vote, the municipal power scheme which had seemed such a sure thing failed to carry a single voting precinct.

These were the major factors in the campaign that won public support:

First Came the Facts

The first step was intensive research to collect every fact that would support the company's position. Volumes of material were collected and summarized in a fact book entitled "Why you will benefit by keeping business-managed, tax-paying electric service in Ogdensburg." This small booklet, purposely modest in size and format, was the source for speeches, advertisements, letters, and all campaign material. The company went to extraordinary efforts to make sure that every statement could be supported and proved.

Door-to-Door Campaign

All 43 employees in the city and about 100 more in the area were thoroughly briefed on the company's arguments in a series of small meetings. Their suggestions, comments, and criticisms helped to refine the fact book and point publicity at the right targets.

Five weeks before the referendum, company employees in Ogdensburg set out on a door-to-door campaign to sell the company and private enterprise. This volunteer work was done mostly on evenings and week-ends. The volunteers were reinforced by several commercial department employees who devoted most of their time to calls, particularly on business men.

A letter from the local manager was sent to all homes ahead of the calls. These calls proved to be one of the key factors in winning early support for the company. They revealed that a majority of the people were not sold on municipal power and also revealed that their chief concern were not with low rates but the reliability of the service and the competency and experience of Niagara Mohawk personnel as compared with personnel that might run the city power system under political management.

Citizens Committee

Another major factor was that the Citizens Committee Against City Owned Power was no mere front and had vigorous and able leadership. The committee, tentatively started by a handful of people, became a rallying point for those opposed to public power. It grew to over 125 members and took a decisive part in the campaign.

The committee issued statements, placed ads, staged a television show and radio debate, and showed no inhibitions in its all-out attack on the municipal power plan.

"The results of the referendum confirm our belief that the majority of people everywhere are opposed to government intrusion into . . . business. Here, as on many other occasions when the people were consulted, they made their opposition clear and positive."—Earle J. Machold, president, Niagara Mohawk Power Corp.

Organized Labor Helps

A significant aspect was the support given Niagara Mohawk by organized labor. Most of the employees of Niagara Mohawk are represented by the International Brotherhood of Electrical Workers (AFL-CIO) and the local and international organizations of that union gave their fullest support. They enlisted the aid of other union groups in the city, placed effective newspaper and radio advertising (see ad on p 51), and undertook much personal missionary work in the company's behalf.

Last-Minute Ad Campaign

Guided by the advice of its local personnel and the Citizens Committee, the company held back newspaper and radio advertising on the issues until late in the campaign. Even so, and typically, it was accused of spending "millions" for this purpose.

Company advertising was primarily factual and emphasized quality and dependability of service, experience of personnel, loss of taxes and the like. Advertising placed by the Citizens Committee came out swinging and frequently had a highly localized slant. The union, as well as the company, placed its stress on calibre, experience, and popularity of local employees.

One unusual campaign device was a color movie taken by the company photographer and run in the local theater for seven days. Titled a "New Viewpoint," it pictured Ogdensburg from the viewpoint of local linemen on their jobs and showed many local scenes with company facilities in use. Theater goers were introduced to many company people and their jobs by this movie, and gained a new concept of an electric distribution system. The picture emphasized the skill and training of local utility employees.

Canadians Study Homathko

British Columbia Power Commission has dispatched a 30-man survey party to the northern mainland of the province for a four-month survey of the Homathko River, from Bute Inlet to Chilco Lake.

Possible dam sites will be explored, also the feasibility of certain water diversions. The party will carry out engineering investigations including cross sections, river metering, topography, soundings, and the establishment of key elevations.

A hydro potential of more than 750,000 kw is believed feasible. It could be developed in economic stages as load growth warrants. The Commission would transmit power to Vancouver Island to meet its rapidly increasing requirements.

This feature appears on this page every two weeks.

Future Financing

(Furnished by the Irving Trust Co from the "Financing Calendar")

July calendar shows electric and gas companies will sell at least $140 million new issues and in addition the telephone issue of $250 million is on the calendar.

Already scheduled for August is $110 million electric and gas financing and $115 million telephone public financing.

New offerings are evenly spaced throughout July and August.

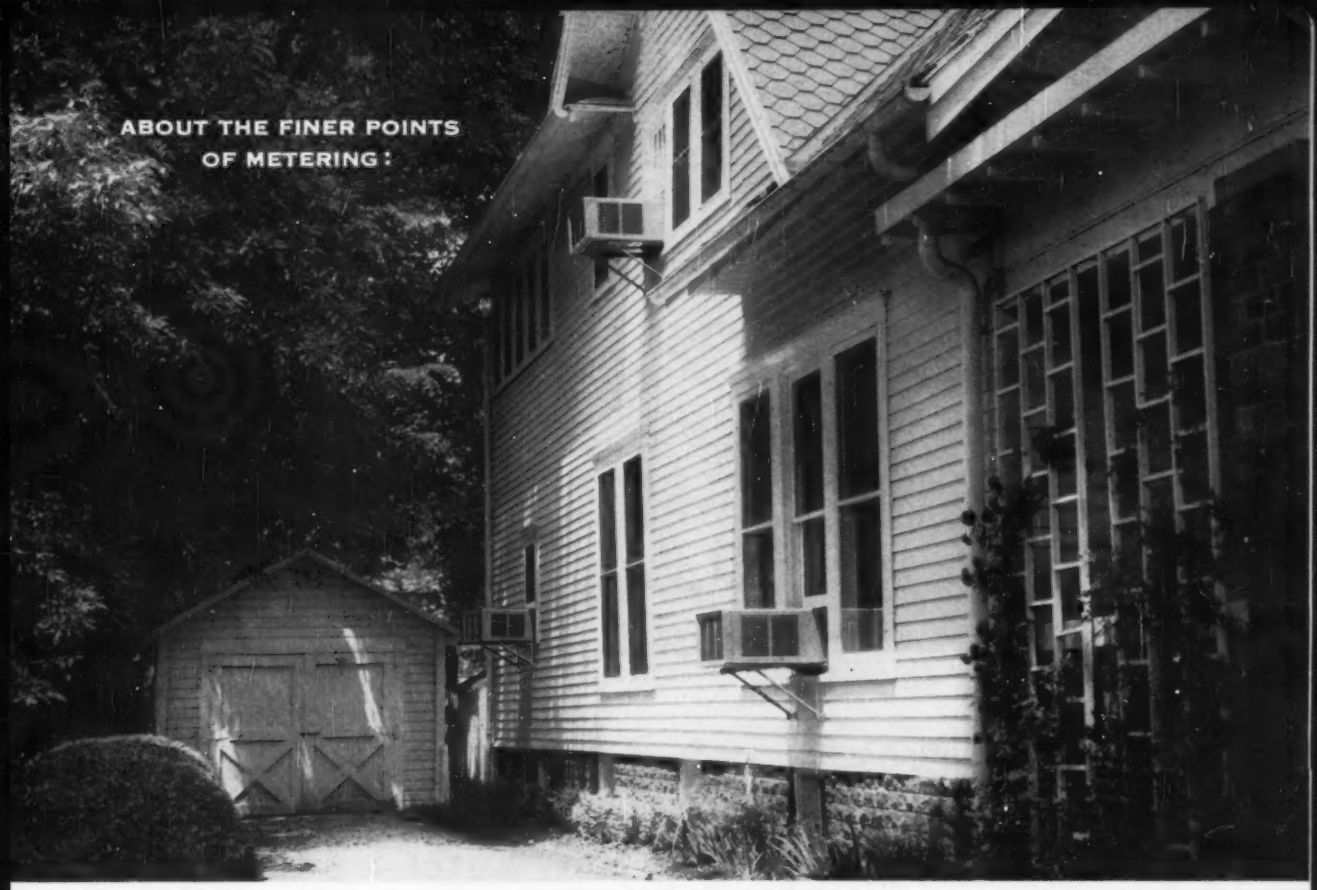
There are no apparent "log-jams" as yet, even though expected financing is rather heavy, compared to the usual summer "doldrums."

The $1.6 billion financing program for electric utilities was about 47% completed during first half of 1956. This is below the 55/60% usually completed by mid-year. Therefore it now looks like financing will be rather heavy through the fall months.

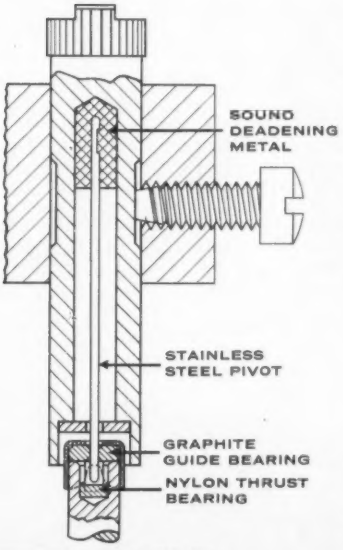
Due Diligence Meetings: July 2, Pacific Power & Light Co; July 26, Jersey Central Power & Light Co; August 10, Consumers Power Co; August 22, Consolidated Natural Gas Co; August 27, Tampa Electric Co, and October 15, Ohio Power Co.

DATE	COMPANY	Amount of Offering (millions) DEBT	EQUITY
JULY			
2	Florida Power	$20.0–C	.....
2	State of Connecticut	50.0–C	.....
9	Sperry Rand	.....	62.0–N-rt COM
10	American Telephone & Telegraph	250.0–C	.....
10	Tennessee Gas Transmission	30.0–N	.....
11	Pacific Power & Light	.....	9.3–C-rt COM
11	Commonwealth of Massachusetts	38.0–	.....
11	Atlantic Gas Light	.....	2.0– –rt COM
17	Union Electric Co	40.0–C	.....
17	Atlanta Gas Light	5.0–C	.....
24	Illinois Power	20.0–C	.....
31	Jersey Central Power & Light	10.0–C	.....
JULY			
No Date	Florida State Turnpike Authority	185.0–N	.....
	City of Memphis Power Plant	135.0–N	.....
	Armstrong Rubber	17.0–	.....
AUG.			
14	Consumers Power	40.0–C	.....
15	U. S. Governments	12,500.0–R	.....
21	Pacific Telephone & Telegraph	78.0–C	15.6– –rt COM
28	Consolidated Natural Gas	30.0–C	.....
29	Tampa Electric	10.0–C	.....
30	New England Telephone & Telegraph	.....	19.0– –rt COM (1)
AUG.			
No Date	Michigan-Wisconsin Pipeline	25.0–C	.....
SEPT.			
10	Gulf States Utilities	15.0–C	3.0–C COM
11	Carolina Power & Light	15.0–C	.....
12	Northern States Power	15.0–C	.....
17	U. S. Governments	1/6,200.0–R	.....
25	Virginia Electric & Power	20.0–C	.....
SEPT.			
No Date	Southern Counties Gas	15.0–C	.....
	Pennsylvania Tunnel	25.0–C	.....
3rd Quarter of 1956 (Month not indicated)			
	Ohio Power	28.0–C	6.0– –Pfd
	California Toll Bridge	34.0–C	.....
	South Carolina Electric & Gas	5.0–P	.....
	Rochester Gas & Electric	.....	5.0–N-Pfd
	Texas Eastern Transmission	.....	15.0–N-Pfd
	Detroit Edison	60.0–C-cv-rt	.....
	U. S. Governments	0/3,000.0–*	.....
	Kansas-Nebraska Natural Gas	5.5–P	.....
	J. P. Stevens	30.0–N	.....
	U. S. Rubber	50/60 –cv-rt	.....
	CIT Financial	75.0–N	.....
	St. Regis Paper	.....	23.2– –rt COM
	Dade County, Florida	34.5–C	.....
	Central Vermont Public Service	1.8–N	0.7–N COM
	Northern Indiana Public Service	.....	14.0– –Pfd
	City of Dallas	40.7	.....
	Washington State Toll Bridge	227.0–C	.....
	Oklahoma Turnpike	63.0	.....
	Long Island Lighting	.....	12.0–N-Pfd
	Kaiser Steel	100.0–P	.....
	United Illuminating	.....	12.5– –Pfd
	Central Illinois Light	.....	8.0– –Pfd
OCT.			
2	Columbia Gas System	20.0–C	.....
16	Public Service of Indiana	30.0–C	.....
17	Ohio Power	28.0–C	6.0– –Pfd
OCT.			
No Date	Delaware Power & Light	.....	6.0–C
	New England Power	10.0–C	.....
	North-South Indiana Toll Road	220.0–C	.....
	California Electric Power	6.0–C	.....
NOV.			
13	Metropolitan Edison	10.0–C	.....
No Date	Transcontinental Gas Pipe Line	20.0–P	.....
	Long Island Lighting	20/25.0–C	.....
DEC.			
3	U. S. Governments	9,100.0– –R	.....
DEC.			
No Date	Appalachian Electric Power	24.0–C	.....
	Essex County Electric	20.0–C	.....
4th Quarter of 1956 (Month not indicated)			
	Tennessee Gas Transmission	50.0–N	.....
	Kansas City Power & Light	20.0–C	.....
	Texas Eastern Transmission	15.0–N	.....
	Otter Tail Power	5.0–N	.....
	Northern Natural Gas	20.0–N	.....
	Philadelphia Electric	30.0–C	.....
	Southern Union Gas	.....	3.0– –rt COM
	Columbus & Southern Ohio Electric	.....	some Pfd
	U. S. Governments	0/2,000.0*	.....
	North American Aviation	.....	40.0–N-rt COM

Symbols: C-Competitive; N-Negotiated; P-Private; R-Refunding; cv-convertible; rt-Rights; Pfd-Preferred; COM-Common. (1) Does not include amount to be offered to parent company. *Estimated.



For better protection against "heat storms"



UPPER BEARING SYSTEM

When the mercury goes up and air conditioners go on—other power loads go up too—and the disks of your watthour meters really start to spin!

Sangamo J2 Meters are equipped with bearing systems that are friction-free at both *bottom and top* of the disk spindle. (They'll even run upside down!) Upward thrusts of fast spinning disks are taken by a special nylon bearing in the top of the spindle.

Heavy loads increase the wear on meter bearings because the torques tend to shift the axis of the disk. The J2 upper thrust bearing limits this change preventing increased wear at heavy loads.

The J2 meter's slow speed is another factor which gives Sangamo's bearing system a longer life. This general purpose meter makes only ten revolutions per minute at full nameplate rating . . . another reason why the J2 is your best investment in a watthour meter.

JM56-4

SANGAMO

ELECTRIC COMPANY Springfield, Illinois

STATISTICS

Your Monthly Electric Bill in Key Cities Across the Country

Akron	$6.30	Indianapolis	$6.65	New Orleans	$6.83	Salt Lake City	$6.68
Baltimore	7.79	*Knoxville	5.00	New York	8.39	San Francisco	6.44
Boston	9.53	Lawrence	8.96	*Omaha	6.47	*Seattle	4.40
Charleston (S.C.)	7.28	Little Rock	8.54	Philadelphia	6.48	Spokane	4.61
Cincinnati	6.75	*Los Angeles	4.90	Phoenix	7.35	Springfield (Ill)	4.80
Cleveland	6.97	Louisville	5.60	Pittsburgh	6.95	*Tacoma	3.20
Dallas	6.86	Miami	8.16	Portland (Oreg)	5.25	Toledo	6.50
Denver	6.54	Milwaukee	6.03	Providence	8.85	Tulsa	7.69
Des Moines	6.87	Minneapolis	7.84	St. Louis	6.56	Washington	6.38
Detroit	7.74	Mobile	5.60	St. Paul	8.13	Wilmington	8.00

*publicity owned utility

Source: Federal Power Commission — Net monthly 250 Kwhr residential electric bill as of Jan. 1, 1956.

The national average residential bill for 250 Kwhr a month usage (for small appliances, lighting, refrigeration and cooking) totalled $7.07 on the first of this year. This is a continuation of a slight upward trend started in 1952 but is considerably lower than the $12.86 recorded in 1925.

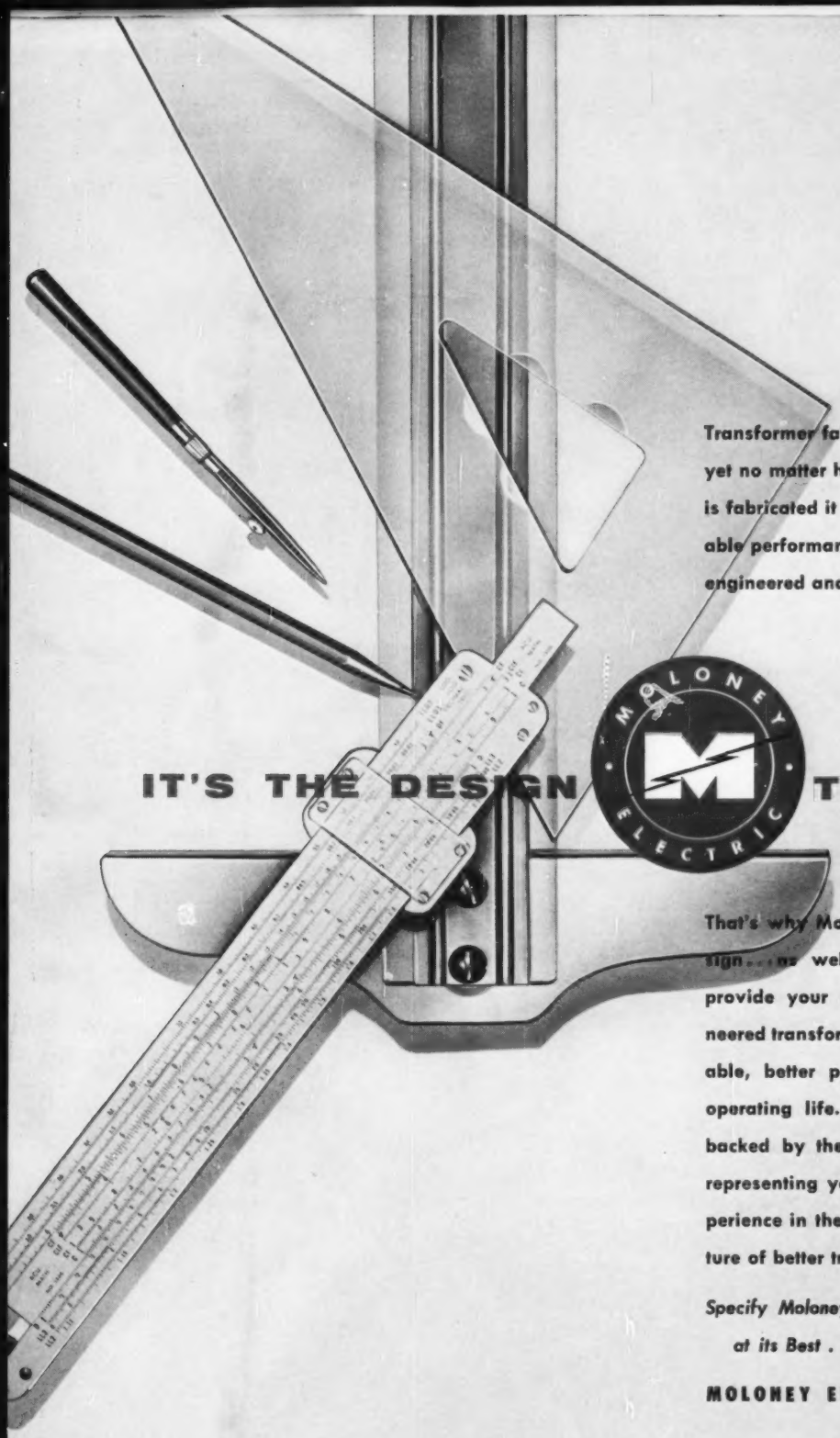
Annual usage city by city during 1954 (latest available year) varied from a high of 8,212 Kwhr per customer in Tacoma, Washington, to a low of 1,137 kwhr in Lawrence, Mass. Nationwide average for cities of 50,000 population or above was 2,288 kwhr — up 8.2% over 1953.

Power Statistics . . .

		Latest Month	Preceding Month	Year Ago	Annual Change %
Capacity	April	116.78	116.56	105.30	10.9
Peak—Class I Systems (million kw)	April	91.4	92.3	82.4	10.9
Estimated Dec. '56 Peak	April	105.88	105.68	103.39	2.4
Production—billion kwhr	April	47.49	50.34	42.03	13.0
Hydro		11.55	11.78	10.46	10.4
Fuel		35.94	38.56	31.57	13.8
Sales—billion kwhr	Mar.	45.36	45.41	39.86	13.8
Residential		12.42	13.02	11.13	11.6
Commercial		6.84	6.89	6.20	10.2
Industrial		23.69	23.21	20.25	17.0
Other		2.40	2.28	2.28	5.3
Fuel Consumption	April				
Coal—million tons		11.95	13.39	10.12	18.1
Oil—million barrels		5.76	6.22	5.68	1.4
Gas—billion cu. ft		89.72	85.17	92.82	−3.3
Net Income Class A & B Co's—$ million	April	115.46	117.46	104.90	10.1
Residential Customers—millions	12 mos	44.67	44.60	43.42	2.9
Revenue per kwhr	ended	2.63¢	2.63¢	2.68¢	−1.9
Avg kwhr per customer	Mar. 31	2,819	2,799	2,607	8.1
Avg annual bill		$74.12	$73.67	$69.87	6.1

Business Statistics . . .

Indexes: 1947–49 = 100					
FRB Industrial Production	April	143	143	138	3.6
ENR Construction Cost	June	145.2	144.4	137.5	5.6
BLS Cost-of-living	April	114.9	114.7	114.2	0.6
NEMA Sales	April				
Insulation materials		163	168	160	1.9
Electric appliances		111	120	102	8.8
Wholesale prices	April				
Motors and generators		130.4	126.9	120.5	8.2
Transformers and regulators		135.3	133.1	127.3	6.3
Switchgear and fuses		149.0	147.8	135.5	10.0
GNP—annual rate—$ billion	1st Qtr.	398.5	397.3	375.3	6.2



Transformer fabrication is important, yet no matter how well a transformer is fabricated it can't provide dependable performance unless it's properly engineered and designed.

IT'S THE DESIGN THAT COUNTS

That's why Moloney emphasizes design . . . as well as fabrication . . . to provide your utility with well-engineered transformers that give dependable, better performance and long operating life. You get all this . . . backed by the Moloney Trademark, representing years of pioneering experience in the design and manufacture of better transformers.

Specify Moloney . . . Get Dependability at its Best . . . All Along the Line

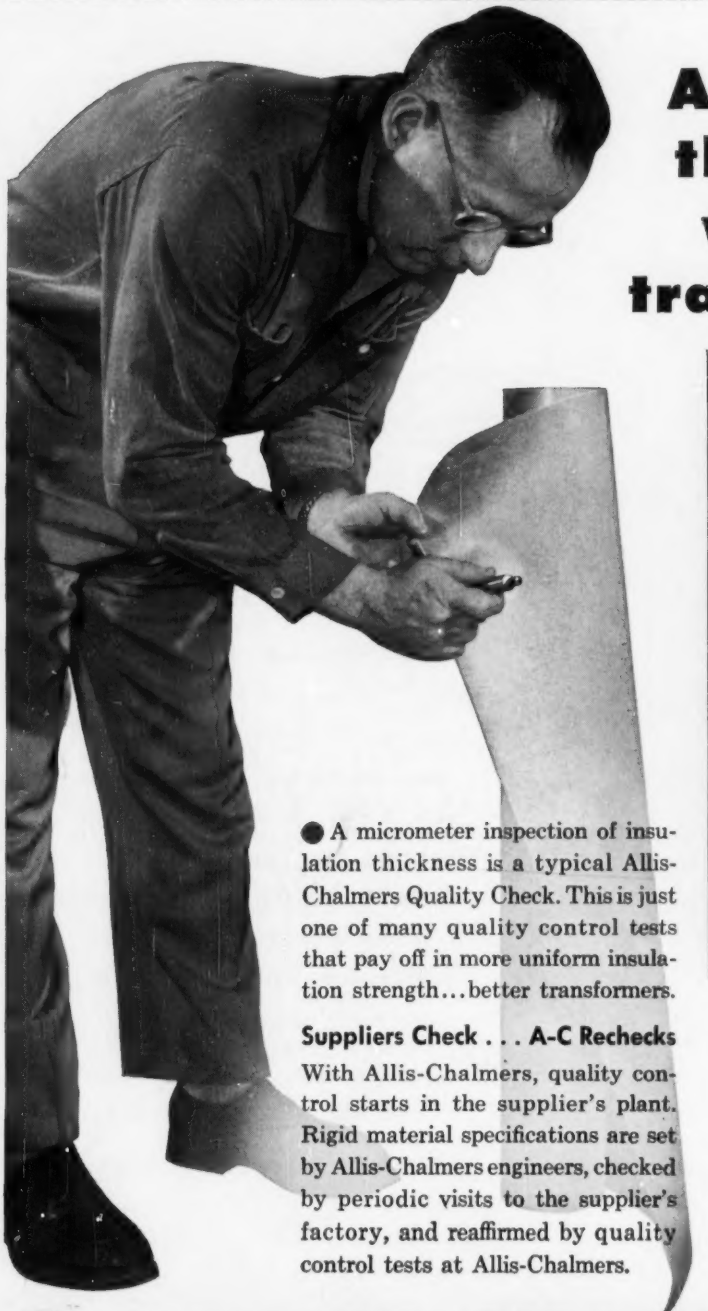
MOLONEY ELECTRIC COMPANY

ME55-51

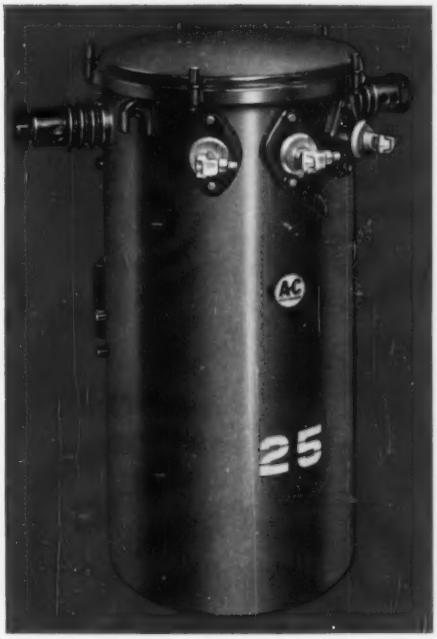
Power Transformers • Distribution Transformers • Load Tap Changing Transformers • Regulating Transformers • Step Voltage Regulators • Primary Unit Substations • Secondary Unit Substation Transformers • Network Transformers • Series Street Lighting Transformers • Subway Transformers • Industrial Dry Type Transformers • Capacitors • Magnetic Components for Electronics

SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA

Quality Control at Allis-Chalmers



A "Check" that pays off with longer transformer life



● A micrometer inspection of insulation thickness is a typical Allis-Chalmers Quality Check. This is just one of many quality control tests that pay off in more uniform insulation strength... better transformers.

Suppliers Check . . . A-C Rechecks

With Allis-Chalmers, quality control starts in the supplier's plant. Rigid material specifications are set by Allis-Chalmers engineers, checked by periodic visits to the supplier's factory, and reaffirmed by quality control tests at Allis-Chalmers.

For the Complete Story on quality control at Allis-Chalmers

. . . and what it means to you, call your nearby Allis-Chalmers office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin for new Bulletin 61B8355.

LIVE BETTER ELECTRICALLY

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-5047